Vol. 1124 Number 2

OFFICIAL GAZETTE

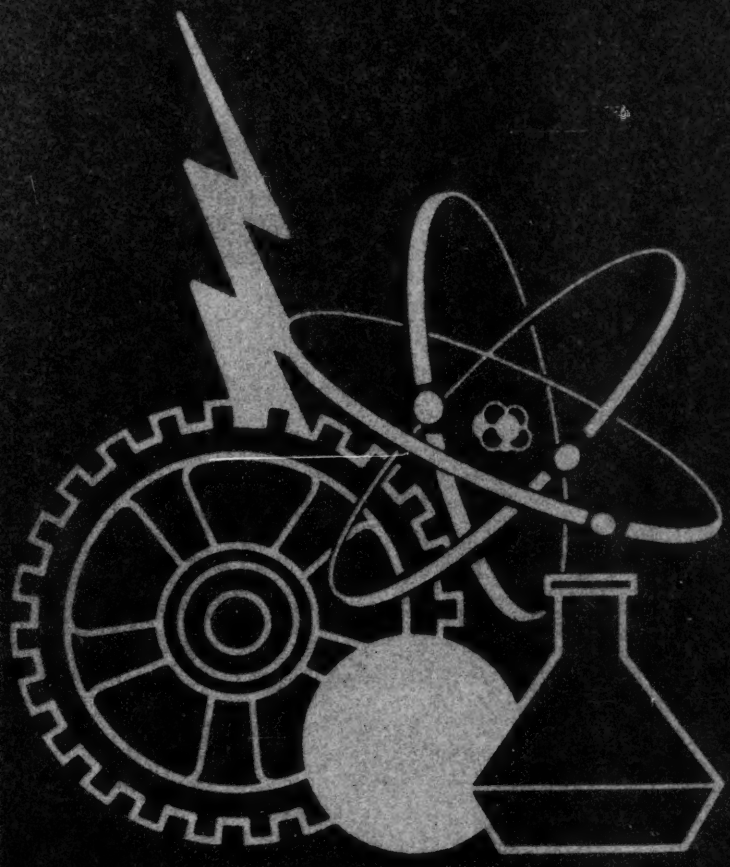
of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

March 12, 1991



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OFFICIAL GAZETTE of the
UNITED STATES PATENT AND TRADEMARK OFFICE

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed.

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
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Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1120 O.G. 14 on Nov. 27, 1990.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17,1990.

The search fee of the European Patent Office was changed due to a difference in the amount of the fee in German Marks and the exchange rate of the U.S. dollar in relation to the German Mark as of Jan. 3, 1991, and was announced in the *Official Gazette* at 1122 O.G. 564 on Jan 1, 1991.

International fees were changed on March 1, 1991 due to a difference in the exchange rate of the U.S. dollar in relation to the Swiss Franc and were announced in the *Official Gazette* at 1122 O.G. 630 on Jan. 22, 1991.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1492.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	559.00
Basic Supplemental fee (for each page over 30)	11.00
Designation fee per country or region for the first 10 national or regional offices	135.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	171.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Dec. 21, 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on March 8, 1988 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,729,130 through 4,730,353
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on March 6, 1984 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,434,511 through 4,435,850
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), and (f), as amended Nov. 5, 1990, which are reproduced below:

37 CFR § 1.20 Post-issuance fees and surcharges

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$415.00
By other than a small entity.....$850.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$835.00
By other than a small enttity.....$1670.00"

The amounts of the surcharges for paying the maintenance fee during the grace period or after the expiration of the patent are set forth in 37 CFR 1.20(k), (l) and (m), which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED DECEMBER 30, 1990 DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,365,366	06/218,486	12/28/82
4,365,378	06/240,994	12/28/82
4,365,386	06/239,906	12/28/82
4,365,406	06/249,281	12/28/82
4,365,408	06/268,790	12/28/82
4,365,415	06/299,955	12/28/82
4,365,424	06/257,214	12/28/82
4,365,427	06/285,527	12/28/82
4,365,434	06/313,745	12/28/82
4,365,452	06/270,227	12/28/82
4,365,454	06/244,331	12/28/82
4,365,463	06/223,162	12/28/82
4,365,464	06/229,217	12/28/82
4,365,467	06/215,612	12/28/82
4,365,469	06/252,451	12/28/82
4,365,483	06/279,339	12/28/82
4,365,493	06/272,337	12/28/82
4,365,504	06/270,676	12/28/82
4,365,506	06/219,250	12/28/82
4,365,509	06/235,557	12/28/82
4,365,535	06/223,705	12/28/82
4,365,537	06/255,876	12/28/82
4,365,539	06/352,044	12/28/82
4,365,542	06/244,677	12/28/82
4,365,544	06/225,745	12/28/82
4,365,547	06/275,573	12/28/82
4,365,553	06/308,363	12/28/82
4,365,588	06/243,442	12/28/82
4,365,604	06/231,234	12/28/82
4,365,625	06/255,395	12/28/82
4,365,642	06/223,337	12/28/82
4,365,660	06/263,141	12/28/82
4,365,662	06/278,006	12/28/82
4,365,668	06/242,664	12/28/82
4,365,674	06/230,389	12/28/82
4,365,681	06/218,936	12/28/82
4,365,689	06/232,339	12/28/82
4,365,715	06/232,418	12/28/82
4,365,725	06/287,710	12/28/82
4,365,736	06/257,702	12/28/82
4,365,757	06/265,560	12/28/82
4,365,758	06/258,284	12/28/82
4,365,762	06/272,663	12/28/82
4,365,767	06/230,533	12/28/82
4,365,791	06/339,056	12/28/82
4,365,803	06/221,525	12/28/82
4,365,807	06/363,540	12/28/82
4,365,852	06/218,111	12/28/82
4,365,882	06/278,644	12/28/82
4,365,897	06/265,526	12/28/82
4,365,928	06/260,386	12/28/82
4,365,929	06/225,781	12/28/82
4,365,954	06/259,693	12/28/82
4,365,955	06/260,406	12/28/82
4,365,957	06/274,539	12/28/82
4,365,966	06/302,008	12/28/82
4,365,969	06/222,506	12/28/82
4,365,973	06/217,915	12/28/82
4,365,985	06/250,961	12/28/82
4,365,992	06/294,446	12/28/82
4,365,996	06/239,626	12/28/82
4,366,000	06/310,771	12/28/82
4,366,002	06/311,058	12/28/82
4,366,017	06/239,060	12/28/82
4,366,028	06/318,991	12/28/82
4,366,029	06/297,753	12/28/82
4,366,037	06/352,837	12/28/82
4,366,039	06/238,637	12/28/82
4,366,041	06/235,454	12/28/82
4,366,047	06/269,590	12/28/82
4,366,053	06/264,166	12/28/82
4,366,056	06/231,629	12/28/82
4,366,063	06/274,654	12/28/82
4,366,065	06/323,698	12/28/82
4,366,078	06/267,899	12/28/82
4,366,090	06/247,201	12/28/82
4,366,104	06/342,351	12/28/82
4,366,106	06/271,031	12/28/82
4,366,116	06/240,676	12/28/82
4,366,127	06/306,673	12/28/82
4,366,129	06/251,997	12/28/82
4,366,132	06/240,892	12/28/82
4,366,155	06/249,054	12/28/82
4,366,157	06/287,039	12/28/82

Patent Number	Serial Number	Issue Date
4,366,159	06/300,394	12/28/82
4,366,171	06/250,468	12/28/82
4,366,182	06/301,962	12/28/82
4,366,184	06/276,215	12/28/82
4,366,190	06/262,194	12/28/82
4,366,196	06/277,230	12/28/82
4,366,205	06/244,897	12/28/82
4,366,207	06/375,524	12/28/82
4,366,212	06/232,778	12/28/82
4,366,218	06/355,029	12/28/82
4,366,220	06/245,751	12/28/82
4,366,221	06/257,239	12/28/82
4,366,225	06/259,126	12/28/82
4,366,226	06/285,721	12/28/82
4,366,231	06/223,746	12/28/82
4,366,232	06/235,388	12/28/82
4,366,234	06/268,476	12/28/82
4,366,238	06/277,375	12/28/82
4,366,260	06/296,222	12/28/82
4,366,272	06/274,161	12/28/82
4,366,274	06/216,379	12/28/82
4,366,279	06/294,400	12/28/82
4,366,285	06/282,772	12/28/82
4,366,293	06/274,589	12/28/82
4,366,294	06/278,277	12/28/82
4,366,302	06/273,808	12/28/82
4,366,311	06/303,497	12/28/82
4,366,334	06/229,524	12/28/82
4,366,338	06/223,768	12/28/82
4,366,339	06/298,691	12/28/82
4,366,369	06/236,498	12/28/82
4,366,381	06/216,361	12/28/82
4,366,399	06/221,324	12/28/82
4,366,402	06/216,109	12/28/82
4,366,421	06/270,234	12/28/82
4,366,426	06/299,716	12/28/82
4,366,445	06/238,800	12/28/82
4,366,453	06/226,092	12/28/82
4,366,487	06/245,525	12/28/82
4,366,489	06/227,963	12/28/82
4,366,509	06/249,881	12/28/82
4,366,525	06/240,399	12/28/82
4,366,531	06/292,250	12/28/82
4,631,757	06/601,266	12/30/86
4,631,760	06/758,276	12/30/86
4,631,762	06/732,616	12/30/86
4,631,764	06/619,729	12/30/86
4,631,768	06/681,646	12/30/86
4,631,770	06/809,298	12/30/86
4,631,779	06/722,072	12/30/86
4,631,785	06/765,649	12/30/86
4,631,799	06/668,634	12/30/86
4,631,813	06/767,501	12/30/86
4,631,822	06/630,808	12/30/86
4,631,824	06/754,382	12/30/86
4,631,827	06/689,930	12/30/86
4,631,838	06/737,394	12/30/86
4,631,849	06/715,733	12/30/86
4,631,850	06/708,423	12/30/86
4,631,852	06/850,546	12/30/86
4,631,856	06/785,270	12/30/86
4,631,858	06/763,638	12/30/86
4,631,861	06/748,213	12/30/86
4,631,862	06/629,207	12/30/86
4,631,865	06/550,045	12/30/86
4,631,866	06/745,862	12/30/86
4,631,867	06/685,823	12/30/86
4,631,868	06/678,031	12/30/86
4,631,872	06/568,963	12/30/86
4,631,875	06/755,353	12/30/86
4,631,880	06/695,392	12/30/86
4,631,882	06/705,796	12/30/86
4,631,883	06/611,199	12/30/86
4,631,886	06/643,078	12/30/86
4,631,887	06/825,132	12/30/86
4,631,888	06/774,308	12/30/86
4,631,907	06/702,871	12/30/86
4,631,909	06/758,093	12/28/86
4,631,910	06/681,219	12/30/86
4,631,930	06/823,389	12/30/86
4,631,942	06/770,780	12/30/86
4,631,957	06/576,520	12/30/86
4,631,958	06/591,180	12/30/86
4,631,968	06/743,063	12/30/86
4,631,972	06/628,488	12/30/86
4,631,985	06/811,107	12/30/86
4,631,989	06/740,853	12/30/86
4,631,990	06/761,773	12/30/86
4,631,994	06/623,433	12/30/86
4,631,995	06/799,243	12/30/86
4,631,997	06/830,359	12/30/86
4,632,000	06/727,013	12/30/86
4,632,002	06/446,557	12/30/86
4,632,003	06/754,945	12/30/86
4,632,008	06/710,595	12/30/86
4,632,016	06/707,380	12/30/86
4,632,018	06/706,914	12/30/86
4,632,020	06/622,448	12/30/86
4,632,024	06/806,250	12/30/86
4,632,040	06/822,791	12/30/86
4,632,042	06/792,967	12/30/86
4,632,047	06/630,189	12/30/86
4,632,053	06/754,415	12/30/86
4,632,066	06/611,355	12/30/86
4,632,067	06/803,562	12/30/86
4,632,083	06/701,247	12/30/86
4,632,086	06/521,013	12/30/86
4,632,089	06/683,144	12/30/86
4,632,090	06/670,874	12/30/86
4,632,092	06/860,962	12/30/86
4,632,102	06/667,424	12/30/86
4,632,103	06/797,985	12/30/86
4,632,104	06/776,602	12/30/86
4,632,107	06/754,346	12/30/86
4,632,113	06/778,894	12/30/86
4,632,118	06/842,796	12/30/86
4,632,127	06/745,181	12/30/86
4,632,128	06/745,690	12/30/86
4,632,130	06/660,430	12/30/86
4,632,135	06/691,596	12/30/86
4,632,138	06/746,724	12/30/86
4,632,153	06/828,313	12/30/86
4,632,157	06/745,292	12/30/86
4,632,161	06/692,693	12/30/86
4,632,169	06/729,522	12/30/86
4,632,175	06/732,503	12/30/86
4,632,180	06/836,055	12/30/86
4,632,197	06/746,087	12/30/86
4,632,200	06/681,093	12/30/86
4,632,201	06/790,091	12/30/86
4,632,219	06/765,071	12/30/86
4,632,221	06/621,550	12/30/86
4,632,237	06/552,257	12/30/86
4,632,240	06/645,157	12/30/86
4,632,241	06/657,534	12/30/86
4,632,243	06/743,826	12/30/86
4,632,249	06/694,396	12/30/86
4,632,251	06/813,547	12/30/86
4,632,253	06/678,872	12/30/86
4,632,259	06/586,779	12/30/86
4,632,266	06/832,252	12/30/86
4,632,272	06/714,904	12/30/86
4,632,275	06/653,874	12/30/86
4,632,277	06/632,490	12/30/86
4,632,287	06/832,118	12/30/86
4,632,288	06/784,619	12/30/86
4,632,289	06/779,024	12/30/86
4,632,293	06/771,656	12/30/86
4,632,299	06/740,412	12/30/86
4,632,308	06/791,519	12/30/86
4,632,328	06/758,942	12/30/86
4,632,330	06/737,446	12/30/86
4,632,332	06/707,813	12/30/86
4,632,340	06/754,253	12/30/86
4,632,345	06/780,850	12/30/86
4,632,347	06/730,762	12/30/86

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4,632,348	06/808,276	12/30/86
4,632,351	06/742,470	12/30/86
4,632,361	06/773,578	12/30/86
4,632,364	06/709,806	12/30/86
4,632,368	06/724,298	12/30/86
4,632,379	06/746,794	12/30/86
4,632,381	06/496,658	12/30/86
4,632,386	06/696,618	12/30/86
4,632,388	06/691,010	12/30/86
4,632,389	06/639,492	12/30/86
4,632,394	06/688,449	12/30/86
4,632,397	06/697,561	12/30/86
4,632,400	06/747,811	12/30/86
4,632,402	06/669,324	12/30/86
4,632,408	06/685,688	12/30/86
4,632,409	06/593,551	12/30/86
4,632,410	06/739,172	12/30/86
4,632,414	06/623,511	12/30/86
4,632,417	06/758,102	12/30/86
4,632,418	06/622,294	12/30/86
4,632,425	06/752,641	12/30/86
4,632,430	06/608,116	12/30/86
4,632,433	06/772,313	12/30/86
4,632,436	06/772,367	12/30/86
4,632,438	06/754,609	12/30/86
4,632,444	06/730,060	12/30/86
4,632,452	06/748,867	12/30/86
4,632,459	06/605,564	12/30/86
4,632,465	06/773,026	12/30/86
4,632,483	06/759,369	12/30/86
4,632,494	06/840,539	12/30/86
4,632,498	06/783,312	12/30/86
4,632,500	06/628,484	12/30/86
4,632,501	06/580,657	12/30/86
4,632,522	06/665,357	12/30/86
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4,632,545	06/702,075	12/30/86
4,632,554	06/558,590	12/30/86
4,632,558	06/595,778	12/30/86
4,632,560	06/823,079	12/30/86
4,632,565	06/665,645	12/30/86
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4,632,611	06/604,665	12/30/86
4,632,616	06/682,330	12/30/86
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4,632,620	06/732,257	12/30/86
4,632,625	06/611,405	12/30/86
4,632,627	06/721,212	12/30/86
4,632,641	06/604,659	12/30/86
4,632,657	06/257,363	12/30/86
4,632,658	06/756,596	12/30/86
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4,632,676	06/449,827	12/30/86
4,632,692	06/644,193	12/30/86
4,632,698	06/766,782	12/30/86
4,632,700	06/785,592	12/30/86
4,632,706	06/656,196	12/30/86
4,632,721	06/785,074	12/30/86
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4,632,760	06/774,953	12/30/86
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4,632,774	06/531,965	12/30/86
4,632,780	06/281,928	12/30/86
4,632,783	06/732,988	12/30/86
4,632,793	06/484,845	12/30/86
4,632,796	06/816,423	12/30/86
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4,632,809	06/609,559	12/30/86
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4,632,885	06/356,988	12/30/86
4,632,909	06/547,235	12/30/86
4,632,920	06/655,079	12/30/86
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4,632,926	06/511,264	12/30/86
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4,633,020	06/783,178	12/30/86
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4,633,030	06/762,200	12/30/86
4,633,031	06/663,313	12/30/86
4,633,037	06/581,898	12/30/86
4,633,042	06/634,696	12/30/86
4,633,050	06/714,848	12/30/86
4,633,052	06/769,090	12/30/86
4,633,055	06/713,045	12/30/86
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4,633,233	06/702,584	12/30/86
4,633,235	06/684,072	12/30/86
4,633,236	06/747,306	12/30/86
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4,633,253	06/514,226	12/30/86
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4,633,340	06/797,865	12/30/86
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4,633,448	06/334,347	12/30/86
4,633,458	06/595,398	12/30/86
4,633,470	06/536,951	12/30/86
4,633,486	06/784,831	12/30/86
4,633,491	06/701,168	12/30/86
4,633,493	06/661,756	12/30/86
4,633,513	06/616,016	12/30/86
4,633,515	06/598,210	12/30/86
4,633,520	06/569,672	12/30/86

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

4,408,616, Re. S. N. 07/645,353, Filed Jan. 24, 1991, Cl. 128, BRAIN ELECTRICAL ACTIVITY MAPPING, Frank H. Duffy, et al., Owner of Record: *The Children's Medical Center Corp., Boston, Mass.*, Attorney or Agent: David L. Feigenbaum, Ex. Gp.: 335

4,597,301, Re. S. N. 07/643,204, Filed Jan. 18, 1991, Cl. 74/15.86, POWER TAKEOFF SPEED CONTROL ASSEMBLY, Philip J. Weis, et al., Owner of Record: *Dana Corp., Toledo, Ohio,* Attorney or Agent: Kevin J. Heinl, Ex. Gp.: 352

4,599,810, Re. S. N. 07/646,828, Filed Jan. 25, 1991, Cl. 36/55, WATERPROOF SHOE CONSTRUCTION, Guillaume Sacre, Owner of Record: *Gore Enterprise Holdings, Inc., Newark, Del.*, Attorney or Agent: Christopher E. Chalsen, Ex. Gp.: 244

4,648,215, Re. S. N. 07/646,502, Filed Jan. 22, 1991, Cl. 51, METHOD AND APPARATUS FOR FORMING A HIGH VELOCITY LIQUID ABRASIVE JET, Mohamed A. Hashish, et al., Owner of Record: *Flow International Corp., Kent, Wash.*, Attorney or Agent: Robert B. Hughs, Ex. Gp.: 323

4,742,374, Re. S. N. 07/619,020, Filed Nov. 28, 1990, Cl. 355/27, COPYING APPARATUS, Takemi Yamamoto, et al., Owner of Record: *Brother Kogyo Kabushi Kaisha, Nagoya-Shi, Japan,* Attorney or Agent: James A. Oliff, Ex. Gp.: 211

4,773,758, Re. S. N. 07/589,061, Filed Sept. 26, 1990, Cl. 356/345, SENSOR USING FIBER INTERFEROMETER, Herbert J. Shaw, Owner of Record: *The Board of Trustees of the LeLand Stanford Junior University, LeLand, Calif.*, Attorney or Agent: Drew S. Hamilton, Ex. Gp.: 255

4,788,364, Re. S. N. 07/645,421, Filed Jan. 11, 1991, Cl. 585/312, CONVERSION OF PARAFFINS TO GASOLINE, Mohsen N. Harandi, Owner of Record: *Mobil Oil Corp., New York, N.Y.*, Attorney or Agent: Robert B. Furr, Ex. Gp.: 116

4,788,981, Re. S. N. 07/623,191, Filed Dec. 6, 1990, Cl. 128/660.07, PULSE COMPRESSION APPARATUS FOR ULTRASONIC IMAGE PROCESSING, Tatsuo Nagasaki, et al., Owner of Record: *Olympus Optical Co., Ltd., Tokyo, Japan,* Attorney or Agent: Thomas Langer, Ex. Gp.: 335

4,799,388, Re. S. N. 07/645,212, Filed Jan. 24, 1991, Cl. 73/861.63, APPARATUS AND TECHNIQUE FOR METERING LIQUID FLOW, Robert M. Hunter, Owner of Record: *Inventor,* Attorney or Agent: Steve Rosenblatt, Ex. Gp.: 267

4,799,699, Re. S. N. 07/645,580, Filed Jan. 24, 1991, Cl. 280/79.5, DOLLY FRAME, Robert C. Berfield, et al., Owner of Record: *Shop-Vac Corp., Williamsport, Pa.*, Attorney or Agent: Robert C. Faber, Ex. Gp.: 316

4,882,144, Re. S. N. 07/647,611, Filed Jan. 28, 1991, Cl. 424/80, SOLID, RAPIDLY RELEASED MEDICAMENT PREPARATIONS CONTAINING DIHYDROPYRIDINES, AND PROCESSES FOR THIER PREPARATION, Ahmed Hegasy, Owner of Record: *Bayer Aktiengesellschaft, Leverkusen, Germany,* Attorney or Agent: Leonard Horn, Ex. Gp.: 152

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

De. 307,059, Reexam. No. 90/002,259, Requested Jan. 22, 1991, Cl. D26/074, RECESSED LIGHTING FIXTURE, Donald D. Szymanek, Owner of Record: *Thin Lite Corp., Camarillo, Calif.*, Attorney or Agent: Vern Schooley, Fulwider, Patton, Lee & Utecht, Long Beach, Calif., Ex. Gp.: 291, Requester: W.H. Neiman, Knobbe, Martens, Olson, Bear, Newport Beach, Calif.

Re. 33,397, Reexam. No. 90/002,255, Requested Jan. 22, 1991, Cl. 220/094, DISPOSABLE FAN, Gary P. Anders, Owner of Record: *Durable, Inc., Schaumberg, Ill.*, Attorney or Agent: Gerstman & Ellis, Chicago, Ill., Ex. Gp.: 241, Requester: Owner

3,783,703, Reexam. No. 90/002,260, Requested Jan. 24, 1991, Cl. 074/157, RATCHET MECHANISM, Lester B. Trimble, et al., Owner of Record: *Fasco Hand Tools, Inc., East Windsor, Conn.*, Attorney or Agent: Leonard Bloom, Towson, Md., Ex. Gp.: 352, Requester: Owner

4,445,114, Reexam. No. 90/002,266, Requested Feb. 4, 1991, Cl. 340/726, APPARATUS FOR SCROLLING A VIDEO DISPLAY, David R. Stubben, Owner of Record: *Atari Games Corp., Sunnyvale, Calif.*, Attorney or Agent: Jerry T. Sewell, Knobbe, Martens, Olson & Bear, Newport Beach, Calif., Ex. Gp.: 269, Requester: Nintendo of America, Redmond, Wash.

4,589,876, Reexam. No. 90/002,262, Requested Jan. 28, 1991, Cl. 604/385, SANITARY NAPKIN, Kees J. Van Tilburg, Owner of Record: *The Proctor & Gamble Corp., Cincinnati, Ohio,* Attorney or Agent: Alvin D. Schulman, Marshall, O'Toole, Murry & Bichnell, Chicago, Ill., Ex. Gp.: 336, Requester: Owner

4,758,406, Reexam. No. 90/002,265, Requested Feb. 1, 1991, Cl. 075/313, MOLYBDENUM ADDITION AGENT AND PROCESS FOR ITS PRODUCTION, Harry H. K. Nauta, et al., Owner of Record: *Harry H. K. Nauta, Brielle, Netherlands,* Attorney or Agent: Hopgood, Calimafde, Kalil, Blaustein & Judlowe, New York, N. Y., Ex. Gp.: 111, Requester: Amax, Inc., New York, N. Y.

4,829,747, Reexam. No. 90/002,267, Requested Feb. 1, 1991, Cl. 053/457, METHOD FOR OPENING AND INSERTING MULTI-CELL PARTITIONS, A. David Johnson, Jr., et al., Owner of Record: *Wayne Automation Corp., Morristown, Pa.*, Attorney or Agent: Frederick J. Olsson, Wayne, Pa., Ex. Gp.: 321, Requester: Owner

4,847,588, Reexam. No. 90/002,264, Requested Feb. 1, 1991, Cl. 439/751, ELECTRICAL CONNECTOR WITH PIN RETENTION FEATURE, Ray C. Doutrich, Owner of Record: *E. I. Du Pont De Nemours & Co., Wilmington, Del.*, Attorney or Agent: Barry Estrin, Wilmington, Del., Ex. Gp.: 322, Requester: Owner

4,879,309, Reexam. No. 90/002,263, Requested Jan. 30, 1991, Cl. 514/513, MERCAPTO-ACLYLAMINO ACIDS AS ANTIHYPERTENSIVES, Ronald J. Doll, et al., Owner of Record: *Schering Corp., Kenilworth, N. J.*, Attorney or Agent: Magatti, Nelson, et al., Madison, N. J., Ex. Gp.: 121, Requester:

C. Joseph Faraci, Birch, Stewart, Kolasch & Birch, Falls Church, Va.

4,944,030, Reexam. No. 90/002,261, Requested Jan. 28, 1991, Cl. 354/403, LENS SHUTTER CAMERA INCLUDING ZOOM LENS, Keisuke Haraguchi, et al., Owner of Record: *Asahi Kogaku, Tokyo, Japan,* Attorney or Agent: Sandler, Greenblum & Bernstein, Arlington, Va., Ex. Gp.: 211, Requester: Owner

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Errrata

"All reference to Patent No. 4,972,409 to Floyd J. Backes of New Hampshire for `TRANSPARENT LOAD SHARING FOR PARALLEL NETWORKS, appearing in the Official Gazette of Nov. 20, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,973,852 to Jerome J. Denkevitz of Florida for `EMPTY LOCATION IDENTIFICATION OF COMPONENT PARTS' appearing in the Official Gazette of Nov. 27, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,976,260 to Steven J. Derrick, West Mifflin, Pa. for `APPARATUS AND METHOD FOR RESPIRED GAS COLLECTION AND ANALYSIS' appearing in the Official Gazette of Dec. 11, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,978,599 to Sergio Pesco of Savona, Italy for `COMBINATION OF PHOTOSENSITIVE ELEMENTS FOR USE IN RADIOGRAPHY' appearing in the Official Gazette of Dec. 18, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,980,867 to Richard E. Duren of Texas for `METHOD OF GENERATING SEISMIC WAVELETS USING SEISMIC RANGE EQUATION' appearing in the Official Gazette of Dec. 25, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,983,174 to Allen L. Noreen of St. Paul, Minn. for `REFASTENABLE ADHESIVE TAPE CLOSURE' appearing in the Official Gazette of Jan. 8, 1991 should be deleted since no patent was granted."

"All reference to Patent No. 4,986,984 to Nara Kiyoshi of Japan for `HIGHLY SOLUBILIZED PROTEIN AND PRODUCTION THEREOF' appearing in the Official Gazette of Jan. 22, 1991 should be deleted since no patent was granted."

"All reference to Ptent No. 4,989,192 to Yukio Kurata et al., of Japan for `OPTICAL PICK-UP APPARATUS AND OPTICAL GRATING ASSEMBLY THEREFOR' appearing in the Official Gazette of Jan. 29, 1991 should be deleted since no patent was granted."

PATENTS AVAILABLE FOR LICENSE OR SALE

None published this month.

PATENT NOTICES

Certificates of Correction For Week of March 12, 1991

D. 303,566	4,832,116	4,871,018	4,894,563
D. 305,293	4,833,116	4,871,063	4,894,923
D. 310,211	4,839,254	4,873,067	4,895,211
PP. 6,880	4,839,649	4,873,226	4,896,343
PP. 6,944	4,842,120	4,873,320	4,896,728
PP. 6,949	4,842,520	4,873,643	4,897,091
PP. 6,950	4,844,173	4,877,841	4,897,119
Re. 33,167	4,845,594	4,877,997	4,897,321
4,022,479	4,845,766	4,878,609	4,898,179
4,358,341	4,846,123	4,880,076	4,898,598
4,646,241	4,847,305	4,880,426	4,898,765
4,681,430	4,847,662	4,881,093	4,899,055
4,687,250	4,855,324	4,882,606	4,900,218
4,744,494	4,855,763	4,884,128	4,900,629
4,757,452	4,857,043	4,885,596	4,900,631
4,769,643	4,857,274	4,886,070	4,901,581
4,786,710	4,857,667	4,886,230	4,902,383
4,801,567	4,858,186	4,886,267	4,902,532
4,801,610	4,858,409	4,887,135	4,903,843
4,803,294	4,863,936	4,887,242	4,904,158
4,812,585	4,863,954	4,887,260	4,908,167
4,816,450	4,864,870	4,889,820	4,908,399
4,817,911	4,866,817	4,890,845	4,909,608
4,819,554	4,867,004	4,891,305	4,910,689
4,821,233	4,867,759	4,891,328	4,915,909
4,821,622	4,868,052	4,891,817	4,916,885
4,821,806	4,868,405	4,891,962	4,934,118
4,823,215	4,869,473	4,892,963	4,943,111
4,826,042	4,869,481	4,893,167	4,956,448
4,826,389	4,869,803	4,893,964	4,958,345
4,826,775	4,869,914	4,894,185	4,961,909
4,828,726	4,869,993	4,894,258	
4,830,159	4,870,063	4,894,467	

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	Nashville: Stevenson Science Library,Vanderbilt University	(615) 322-2775
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PATENT EXAMINING CORPS

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STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner

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ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director	308-1235
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GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director	308-0651

Expiration of patents: The patents within the range of numbers indicated below expire during February 1991 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents	Numbers 3,789,427 to 3,795,013 inclusive
Plant Patents	3,463 to 3,500 inclusive

REEXAMINATIONS

MARCH 12, 1991

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B3 4,330,280 (1426th)

EJECTOR HOLDER FOR CAPSULE-LIKE CARTRIDGE

Emery W. Dougherty, and Richard E. Welsh, both of Milford, Del., assignors to Dentsply Research & Development Corp., Milford, Del.

Reexamination Request No. 90/001,860, Oct. 10, 1989.

Reexamination Certificate for Patent No. 4,330,280, issued May 18, 1982, Ser. No. 252,558, Apr. 9, 1981.

Reexamination Certificate B2 4,330,280, issued Nov. 5, 1985.

Reexamination Certificate B1 4,330,280, issued Dec. 5, 1989.

Int. Cl.[5] A61C *5/04*

U.S. Cl. 433—90

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–4, 6–12** is confirmed.

Claim **5** was previously cancelled.

1. A manually operable ejector holder and a loaded capsule-like cartridge in which said cartridge has an annular collar on one end, a discharge tip on the other end, and an intermediate body portion in between, said holder comprising in combination, an elongated barrel having an interior bore, a plunger reciprocable therein and one end projecting beyond said barrel, manually operable lever means on one end of said barrel operable to reciprocate said plunger relative to the other end of said barrel, and said other end of the barrel being cut-away longitudinally a limited distance to provide a compartment having side walls extending a limited distance beyond the axis of said barrel, an undercut groove formed forward of said interior bore and rearwardly in said compartment within said sidewalls to receive the annular collar on said cartridge to prevent relative axial movement between said cartridge and compartment, and the outer longitudinally-extending portions of the sidewalls of said compartment having limited flexibility and extending toward each other a slightly lesser distance than the diameter of said cartridge intermediate body portion to effect a snap-acting retaining means for said cartridge when inserted into said compartment, said retaining means extending longitudinally a distance forward of said undercut groove substantially greater than the longitudinal length of said annular collar to hold a substantial portion of said cartridge intermediate body portion.

B1 4,449,345 (1427th)

INSULATION MODULE HARDWARE

Mack A. Hounsel, and Carlisle O. Byrd, Jr., both of Houston, Tex., assignors to Manville Sales Corp., Denver, Colo.

Reexamination Request No. 90/001,835, Aug. 31, 1989.

Reexamination Certificate for Patent No. 4,449,345, issued May 22, 1984, Ser. No. 490,012, Apr. 29, 1983.

Division of Ser. No. 245,946, Mar. 20, 1981, Pat. No. 4,381,634.

Int. Cl.[5] E04C *1/80*

U.S. Cl. 52—506

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim **10** is cancelled.

Claims **1** and **4** are determined to be patentable as amended.

Claims **2, 3** and **5–9** dependent on an amended claim, are determined to be patentable.

New claims **11–22** are added and determined to be patentable.

1. Attachment hardware adapted for mounting an insulation module on one *wall* surface of a furnace, said module having a hot face and a cold face which between them define a module thickness, a pair of said faces which between them define a module length, and a top face and a bottom face which between them define a module width, said hardware comprising:

suspension arm means extending along [some] *a minor* portion of the length and width of the cold face of the module, said suspension arm means having a plurality of suspension tabs extending from the cold face toward the hot face for some predetermined distance into the thickness of said module intermediate said two side faces;

at least one set of aligned apertures in said suspension tabs;

support bar means extending longitudinally through at least some portion of the length of the module, said support bar means being received in *and supported by* said at least one set of aligned apertures in the plurality of suspension tabs and penetrating said module, said portion of the length of the module being less than the full length whereby said suspension tabs and said support bar means are fully contained internally of said module; and

securement means for securing said suspension arm means to said furnace wall *surface.*

B1 4,488,477 (1428th)

RODLESS CYLINDER

Michikazu Miyamoto, Soka, Japan, assignor to Shoketsu Kinzoku Kogyo Kabushiki Kaisha, Japan

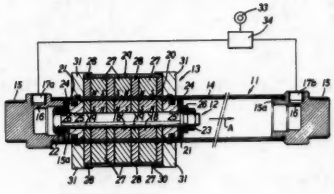
Reexamination Request No. 90/001,910, Dec. 18, 1989.

Reexamination Certificate for Patent No. 4,488,477, issued Dec. 18, 1984, Ser. No. 436,367, Oct. 25, 1982.

Claims priority, application Japan, Nov. 19, 1981, 56-172476

Int. Cl.[5] F01B *11/02*

U.S. Cl. 92—85 R



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **4, 6** and **7** are cancelled.

Claim **1** is determined to be patentable as amended.

Claims **2, 3** and **5,** dependent on an amended claim, are determined to be patentable.

New claims **8** and **9** are added and determined to be patentable.

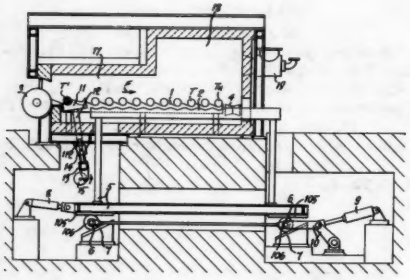
1. A rodless cylinder, in which a driving member driven within a cylinder in the axial direction by the pressure of a fluid is constituted by mounting a driving magnet row to a piston sliding in said cylinder and a driven member disposed to the outer circumference of said cylinder axially slidably is mounted with a driven magnet row, wherein a plurality of individual magnets disposed axially to the cylinder in each of said magnet rows are arranged such that the identical poles of said individual magnets are adjacent to each other, and each of said magnet rows are arranged such that the different poles of said individual magnets are opposed to each other [.], *wherein said driving magnet row is put between a pair of pistons and they are integrated together with dampers abutting against stoppers situated at the stroke ends in the cylinder by being clamped with a bolt inserted through central apertures in said individual magnets, and wherein said cylinder is fitted with a head cover at either end thereof, said head covers contain inwardly directed axial recesses which receive the ends of said bolt at the stroke ends, and said stoppers project axially inwardly from said head covers radially outwardly of said axial recesses.*

B1 4,585,411 (1429th)

METHOD AND WALKING BEAM FURNACE FOR THE INTERMEDIATE HEATING OF PIPES IN HOT ROLLING MILLS

Giorgio Bocci; Sando Brizielli; Agostino Triuzzi, and Stefano Deplano, all of Genoa, Italy, assignors to Italimpianti Societe Italiana Impianti P.A.

Reexamination Request No. 90/001,950, Mar. 2, 1990.
Reexamination Certificate for Patent No. 4,585,411, issued Apr. 29, 1986, Ser. No. 627,003, Jun. 29, 1984.
Filed Mar. 2, 1990, Ser. No. 627,003
Claims priority, application Italy, Jul. 6, 1983, 12565 A/83; May 18, 1984, 12519 A/84
Int. Cl.[5] F27D *3/00*
U.S. Cl. 432—11



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 9–11 is confirmed.

Claim 15 is cancelled.

Claims 1, 2, 7, 8, 12 are determined to be patentable as amended.

Claims 3–6, 9–11, 13 and 14, dependent on an amended claim, are determined to be patentable.

2. [A furnace according to claim 1,] *A walking beam furnace for hot-rolling pipes of the like, located between a rough-roller and a sizing roller, comprising fixed beams (1) and walking beams (2) formed with a plurality of pipe-carrying grooves over the entire length thereof, characterized in that the number of said grooves ishigher than the number of pipes usually accommodated in the furnace, whereby some of them comprise emergency grooves and will be left available for use in case of an emergency to receive the pipes which are upstream of the furnace and which have already been worked in a plug-mill, a charger means (11; 31) for introducing and charging the pipes into the furnace to leave said emergency grooves empty when the furnace is working normally and to introduce into the furnace and position into said emergency grooves the pipes coming from the plug mill when as many pipes cannot be discharged from the furnace due to the disactivation of the sizing mill located downstream, said charger means comprising a door (3; 23) for closing the furnace and for introducing the pipes into the furnace, and a charger device (11; 31) adapted to receive the pipes just introduced by said door and to convey said pipes over the grooves to be left empty for said emergency and to place said pipes onto the fixed beams (1) and walking beams (2) to convey them toward the outlet according to the normal operational cycle, said charger device comprising means for selectively effecting strokes above the emergency grooves to position in each groove one of the pipes which as been introduced during an emergency, and* characterized in that it comprises in the interior thereof, just after the door (3[,]; 23) for introducing the pipes, a charger device (11; 31) which, during the normal operation, advances each pipe which has been introduced, during one single cycle of movement of said walking beams (2), to one of the grooves of the fixed beams (1) following the first groove, said pipe being then picked up therefrom by said transfer walking beams (2) at the beginning of their next cycle of movements, leaving one or more initial stationary grooves empty, whereas in case of an emergency wherein the discharge from the furnace is discontinued, some pipes may still be charged into the furnace, said pipes being positioned by the charger device (11; 31) into the initial empty groove or grooves in the fixed beams (1) and, upon resumption of the discharge, said pipes are advanced by the charger device (11; 31) in synchronism with the transfer walking beams (2), and the introduction of pipes is resumed after said initial groove or grooves in the fixed beams have been made available again.

8. A method for intermediate heating of pipes in a hot rolling mill by means of a walking beam furnace, located between the rolling mill and a sizing mill and having a forehearth zone without burners, a heat zone with burners, a charging end and a discharging end, by carrying the pipes stepwise from the charging end to the discharging end of the furnace through the forehearth zone and the heat zone, comprising the steps of:

(a) maintaining a temperature from about 800° to 850° C. in the forehearth zone,

(b) introducing the pipes in the [foreheath] *forehearth* zone at different respective temperatures ranging from 700° to 1000° C.,

(c) maintaining the pipes in the forehearth zone until they all reach a substantially same temperature of about 850° C. *and,*

(d) heating the pipes in the heat zone to a discharge temperature of from about 920° to 980° C.

B1 4,613,812 (1430th)

MICROWAVE DETECTION SYSTEM

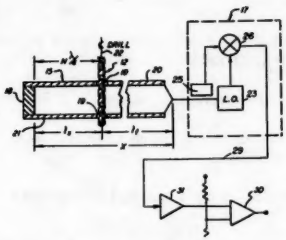
Norbert E. Gelston, II, Skaneateles, N.Y., assignor to U.S. Tech Corporation, Syracuse, N.Y.

Reexamination Request No. 90/002,022, May 14, 1990.
Reexamination Certificate for Patent No. 4,613,812, issued Sep. 23, 1986, Ser. No. 683,160, Dec. 18, 1984.
Continuation-in-part of Ser. No. 579,680, Feb. 13, 1984, abandoned, which is a continuation-in-part of Ser. No. 446,333,
Int. Cl.[5] G01R *27/04;* B23B *39/04*
U.S. Cl. 324—635

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1–17 is confirmed.

1. A microwave detection system useful for detecting the presence or absence of a target within a microwave transmission line which comprises a microwave transmission line having an opening within which the target is situated and means for transmitting a microwave signal down the transmission line toward the target and for receiving a reflected return wave signal traveling the opposite direction positioned at one end of the transmission line and forming a transmitter/receiver means connected to said system for transmitting and receiving signals



to provide an output signal having a component which indicates the presence or absence of the target within the transmission line opening and processing means coupled directly to the output of the said transmitter/receiver means for comparing the component to a predetermined level to determine the presence or absence of the target, the position of the transmission line opening relative to the transmitter/receiver means is selected to optimize the signal strength from the transmitter/receiver means and is less than the length of the transmission line.

B1 4,708,966 (1431st)

NOVEL ANTI-INFLAMMATORY AGENTS, PHARMACEUTICAL COMPOSITIONS AND METHODS FOR REDUCING INFLAMMATION

Maurice E. Loomans; Randall S. Matthews, both of Cincinnati, and Joseph A. Miller, Fairfield, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Reexamination Request No. 90/002,074, Jul. 2, 1990.
Reexamination Certificate for Patent No. 4,708,966, issued Nov. 24, 1987, Ser. No. 879,863, Jun. 27, 1986.
Filed Jul. 2, 1990, Ser. No. 879,863
Int. Cl.[5] A61K *31/12*
U.S. Cl. 514—689

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

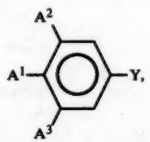
The patentability of claims **10** to **12**, **18**, **19**, **23**, **24** is confirmed.

Claim **1** is determined to be patentable as amended.

Claims **2** to **9**, **13** to **17** and **20** to **22**, dependent on an amended claim, are determined to be patentable.

New claims **25** to **28** are added and determined to be patentable.

1. An anti-inflammatory compound having the structure:



wherein:

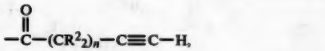
(a) A^1 is selected from the group consisting of —OH, —H, and —O_2CR; wherein R is a straight or branched chain alkyl group having from 1 to about 10 carbon atoms;

(b) A^2 and A^3 are independently selected from the group consisting of —$C(CH_3)_3$, —$Si(CH_3)_3$, and —CF_3; and

(c) Y is selected from the group consisting of:

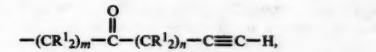
(1) —$(CR^1_2)_n$—C≡C—H, wherein n is an integer from 1 to about 6;

(2)



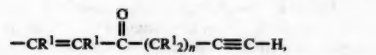
wherein n is an integer from 0 to about 5;

(3)



wherein m is an integer from 1 to about 5, and m+n is an integer from 1 to about 5;

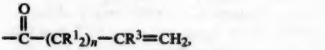
(4)



wherein n is 0 or 1;

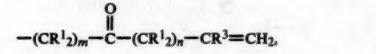
[(5) —$(CR^1_2)_n$—CR^3=CH_2, wherein n is an integer from about 2 to about 6;]

([6]*5*)



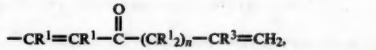
wherein n is an integer from 0 to about 5;

([7]*6*)



wherein m is an integer from 1 to about 3, and m+n is an integer from 1 to about 3;

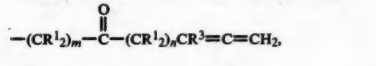
([8]*7*)



wherein n is an integer from 0 to about 3;

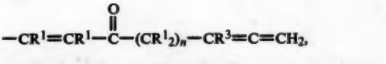
([9]*8*) —$(CR^1_2)_n$—CR^3=C=CH_2, wherein n is an integer from 0 to about 6;

([10]*9*)



wherein m+n is an integer from 0 to about 5;

([11]*10*)

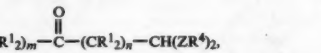


wherein n is an integer from 0 to about 3;

([12]*11*) —$(CR^1_2)_n$—$CH(ZR^4)_2$,

wherein n is an integer from 1 to about 6; and

([13]12



wherein n is an integer from 1 to about 5, m is an integer from 0 to about 4, and m+n is an integer from about 1 to about 5; and

wherein each R^1 is independently selected from the group consisting of —H, —OR^3, —NR^3_2, —NR^3_3+, —$N(R^3)$-$C(O)R^3$, —O_2CR^3, —CO_2R^3, $C(O)NR^3_2$, straight or branched chain saturated alkyl group having from 1 to about 3 carbon atoms, and straight or branched chain unsaturated alkyl group having from 1 to about 3 carbon atoms; each R^2 is independently selected from the group consisting of —H, —OR^3, —NR^3_2, —NR^3_3+, —$N(R^3)C(O)R^3$, —O_2CR^3, —CO_2R^3, $C(O)NR^3_2$, straight or branched chain saturated alkyl group having from 1 to about 3 carbon atoms, and straight or branched chain unsaturated alkyl group having from 1 to about 2 carbon atoms; each R^3 is independently selected from the group consisting of —H, methyl and ethyl; each R^4 is independently selected from the group consisting of —CH_3 and —CH_2CH_3, or the R^4's may be joined to form a cyclic acetal such that both R^4's together are one group selected from —$(CH_2)_2$— and —$(CH_2)_3$—; and each Z is independently selected from the group consisting of O, S, NH, and NR^4; or the pharmaceutically-acceptable salt thereof.

B1 4,820,621 (1432nd)

DEVELOPER SOLUTION FOR POSITIVE-WORKING PHOTORESIST COMPOSITIONS COMPRISING A BASE AND A NON-TOXIC SURFACTANT

Hatsuyuki Tanka; Yoshiyuki Sato, both of Samukawa; Hidekatsu Kohara, Chigasaki, and Toshimasa Nakayama, Hiratsuka, all of Japan, assignors to Tokyo Ohka Kogyo Co., Ltd.

Reexamination Request No. 90/002,004, Apr. 18, 1990.
Reexamination Certificate for Patent No. 4,820,621, issued Apr. 11, 1989, Ser. No. 67,312, Jun. 26, 1987.
Filed Apr. 18, 1990, Ser. No. 67,312
Claims priority, application Japan, Jul. 18, 1986, 61-167897
Int. Cl.[5] G03C 5/18; G03F 7/26
U.S. Cl. 430—331

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims **1–6** are cancelled.

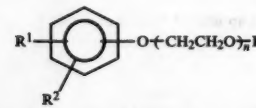
New claims **7–11** are added and determined to be patentable.

7. An aqueous developer solution for a positive photoresist composition for use in the manufacture of semiconductors comprising essentially:

(a) water as a solvent

(b) a water-soluble organic basic compound dissolved in the solvent; and

(c) 50 to 5,000 ppm of a non-ionic surface active agent of a polyoxyethylene dialkylphenyl ether represented by the general formula



in which R^1 is an alkyl group having 5 to 15 carbon atoms, R^2 is an alkyl group having 1 to 15 carbon atoms and n is a positive integer in the range of 5 to 60.

B1 4,847,303 (1433rd)

TERT-BUTYLPHENYL COMPOUNDS USEFUL AS ANTI-INFLAMMATORY AGENTS

Maurice E. Loomans; Randall S. Matthews, both of Cincinnati, Ohio, and Joseph A. Miller, Baton Rouge, La., assignors to The Procter & Gamble Company

Reexamination Request No. 90/002,078, Jul. 2, 1990.
Reexamination Certificate for Patent No. 4,847,303, issued Jul. 11, 1989, Ser. No. 123,694, Nov. 23, 1987.
Int. Cl.[5] A61K 31/12
U.S. Cl. 514—689

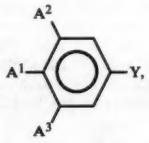
AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim **1** is determined to be patentable as amended.

Claims **2–25**, dependent on an amended claim, are determined to be patentable.

New Claims **26–29** are added and determined to be patentable.

1. A compound having the structure:



wherein:

(a) —A^1 is selected from the group consisting of —OH, —H, and —O_2CR; wherein —R is a straight or branched chain alkyl group having from 1 to about 10 carbon atoms;

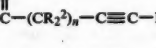
(b) —A^2 is selected from the group consisting of unsubstituted or substituted, saturated or unsaturated, straight, branched or cyclic alkyl having from 1 to 10 carbon atoms; except for C_4 to C_{10} straight-chain, saturated alkyl and tert-butyl; wherein substituents of —A^2 may be one or more of halo, —OR^3, —O_2CR^3, —CO_2R^3, and —$C(O)R^3$;

(c) —A^3 is selected from *the group consisting of* —$C(CH_3)_3$, —$Si(CH_3)_3$, and —CF_3; and

(d) —Y is selected from *the group consisting of:*

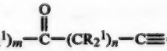
(1) —$(CR^1_2)_n$—C≡C—H, wherein n is an integer from 1 to about 6;

(2)



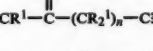
wherein n is an integer from 0 to about 5;

(3)



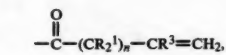
wherein m is an integer from 1 to about 5, and m+n is an integer from 1 to about 5;

(4)



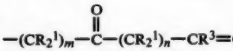
wherein n is 0 or 1; [(5) —$(CR^1_2)_n$—CR^3=CH_2, wherein n is an integer from about 2 to about 6;]

([6] *5*)



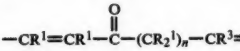
wherein n is an integer from 0 to about 5;

([7] *6*)



wherein m is an integer from 1 to about 3, and m+n is an integer from 1 to about 3;

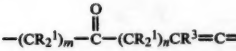
([8] *7*)



wherein n is an integer from 0 to about 3;

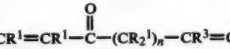
([9] *8*) $-(CR^1{}_2)_n-CR^3{=}C{=}CH_2$, wherein n is an integer from 0 to about 6;

([10] *9*)



wherein m+n is an integer from 0 to about 5;

([11] *10*)



wherein n is an integer from 0 to about 3;

([12] *11*) $-(CR^1{}_2)_n-CH(ZR^4)_2$, wherein n is an integer from 1 to about 6; and

([13] *12*)

wherein n is an integer from 1 to about 5, m is an integer from 0 to about 4, and m+n is an integer from about 1 to about 5;

and wherein each $-R^1$ is independently selected from *the group consisting of* —H, $-OR^3$, $-NR^3{}_2$, $-NR^3{}_3+$, $-N(R^3)C(O)R^3$, $-O_2CR^3$, $-CO_2R^3$, $-C(O)NR^3{}_2$, straight or branched chain saturated alkyl group having from 1 to about 3 carbon atoms, and straight or branched chain unsaturated alkyl group having from [1] *2* to about 3 carbon atoms, or two $-R^1$'s on the same carbon atom are $=O$ or $=CR^3{}_2$; each $-R^2$ is independently selected from *the group consisting of* —H, $-OR^3$, $-NR^3{}_2$, $-NR^3{}_3+$, $-N(R^3)C(O)R^3$, $-O_2CR^3$, $-CO_2R^3$, $-C(O)NR^3{}_2$, straight or branched chain saturated alkyl group having from 1 to about 3 carbon atoms, and straight or branched chain unsaturated alkyl group having from 1 to about 2 carbon atoms, or two $-R^2$s on the same carbon atom are $=O$ or $=CR^3{}_2$; each $-R^3$ is independently selected from —H, methyl and ethyl; each $-R^4$ is independently selected from $-CH_3$ and $-CH_2CH_3$, or the $-R^4$s may be joined to form a cyclic acetal such that both $-R^4$s together are one group selected from $-(CH_2)_2-$ and $-(CH_2)_3-$; and each —Z— is independently selected from —O—, —S—, —NH—, and $-NR^4-$; or the pharmaceutically-acceptable salt thereof.

14. A pharmaceutical composition comprising:

(a) a safe and effective amount of an anti-inflammatory compound of claim **1**; and

(b) a pharmaceutically-acceptable carrier.

REISSUES

MARCH 12, 1991

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 33,550
RESTRAINT EDGE FOR PAVING MEMBERS

Stephen Jones, 10800 Morris Ave., South Bloomington, Minn. 55437

Original No. 4,863,307, dated Sep. 5, 1989, Ser. No. 213,303, Jun. 29, 1988. Continuation-in-part of Ser. No. 103,658, Oct. 2, 1987, abandoned. Application for reissue Apr. 19, 1990, Ser. No. 511,315

Int. Cl.[5] E01C *11/22*

U.S. Cl. 404—7 **119 Claims**

66. Support apparatus for edging and restraining a hard surface means in a given position on ground surface comprising:

substantially vertical strip restraining means for defining a boundary around said hard surface means, said vertical strip restraining means having an upper region, a lower region, an inner surface facing toward said hard surface means for receiving substantially horizontal forces from said hard surface means, and an outer surface facing away from said hard surface means;

base strip extension means extending out from said outer surface of said vertical strip restraining means in said lower region for receiving vertical forces relative to the ground surface;

force converting means for converting said horizontal forces received by said vertical strip restraining means into vertical forces against said base strip extension means thereby restraining said hard surface means in said boundary, said force converting means including connecting strip means for connecting said vertical strip restraining means to said base strip extension means; and

wherein said connecting strip means, a portion of said vertical strip restraining means and a portion of said base extension means form a triangular cross section, said vertical strip restraining means including a border length parallel to said boundary of said hard surface means, said connecting strip means including cut out portions along intervals of said vertical strip restraining means border length, said base strip extension means including cut out portions corresponding to said cut out portions of said connecting strip means.

Re. 33,551
MOTOR VEHICLE GEARBOX

Lars Andersson, Vastra Frolunda, and Sven Andersson, Floda, both of Sweden, assignors to AB Volvo, Goteborg, Sweden

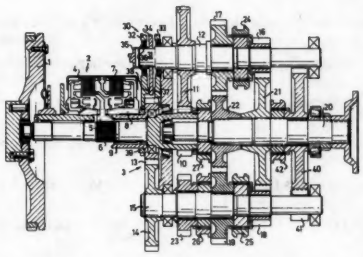
Original No. 4,876,907, dated Oct. 31, 1989, Ser. No. 156,142, Feb. 16, 1988. Application for reissue May 18, 1990, Ser. No. 524,961

Claims priority, application Sweden, Feb. 13, 1987, 8700583

Int. Cl.[5] F16H *3/38*

U.S. Cl. 74—331 **6 Claims**

1. A motor vehicle gearbox, comprising first and second concentrically mounted input shafts, said input shafts arranged to be driven alternately such that one said input shaft comprises a temporarily non-driven input shaft, an output shaft, and first and second countershafts driven by said first and second input shafts, respectively, said countershafts *having spaced parallel axes and* having gear wheels in engagement with gear wheels on said output shaft, *a gear wheel on each countershaft being in driving engagement with a common gear wheel on said output shaft,* at least one of the gear wheels on each countershaft being rotatably mounted thereon and being lockable by means of engaging means to said countershaft, and



each input shaft being in driving engagement with a corresponding countershaft, said first and second countershafts being coordinated with synchronizing means shiftable independently of said engaging means, by means of which synchronizing means each countershaft, which is drivingly coupled to said respective temporarily non-driven input shaft, can be accelerated up to a rotational speed determined by a gear speed selected.

Re. 33,552
DISPENSING VALVE

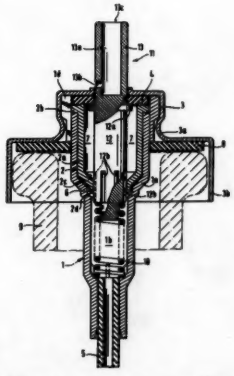
Jean-Louis Bougamont, and Alain Behar, both of Eu, France, assignors to Societe Francaise d'Aerosol et de Bouchage, Courbevoie, France

Original No. 4,842,168, dated Jun. 27, 1989, Ser. No. 79,184, Jul. 29, 1987. Application for reissue Aug. 22, 1990, Ser. No. 570,934

Claims priority, application France, Jul. 30, 1986, 86 11018

Int. Cl.[5] B65D *83/00*

U.S. Cl. 222—402.16 **5 Claims**



1. In a metering and dispensing valve for a container of pressurized material, said valve comprising a body formed of a

cylindrical casing of rigid material, a sleeve fitted inside of said casing, the top end of said casing having disposed thereon a cover defining an aperture through which an elongated atomizer member mounted for reciprocal movement in said aperture protrudes, a front seal creating a fluid-tight joint between said sleeve and said atomizer member, a rear seal creating a fluid-tight joint between said sleeve and said cover, said front and rear seals and said sleeve defining a lock chamber inside of which there is disposed said atomizer member provided with a sliding distributor guided at its ends, a return spring positioned below said distributor which operatively biases the distributor to return towards the cover, and the volume of the lock chamber being dependent on the internal dimensions of said sleeve, the improvement wherein:

(a) the sleeve and the front seal are formed of semi-rigid plastic material having an elastic limit;

(b) the casing forms an abutment surface immediately adjacent to and supporting the front seal such that deformation of the front seal is constrained by said abutment surface so as not to exceed the elastic limit of the front seal; and

(c) a filling means is provided which allows liquid to enter by a route other than the front seal when a reverse pressure is applied during filling.

Re. 33,553

SURFACE TEXTURE READING ACCESS CHECKING SYSTEM

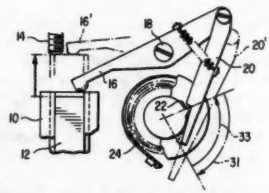
Bertrand C. D'Agraives, Laveno, Italy; Janny Mathieu, and Patrick Jamar, both of Nancy, France, assignors to Euratom, Communaute Europeenne de l'Energie Atomique, Kirchberg, Luxembourg and Promotech, Association Pour la Promotion de la Technologie, Nancy, France

Original No. 4,677,435, dated Jun. 30, 1987, Ser. No. 755,582, Jul. 16, 1985. Application for reissue Oct. 5, 1988, Ser. No. 253,630

Claims priority, application France, Jul. 23, 1984, 84 11643

Int. Cl.[5] G06F *7/04;* G06K *5/00*

U.S. Cl. 340—825.31 **13 Claims**



1. An access control system comprising:

plural authorized support objects each having a relief surface texture;

a reception block able to receive said support objects;

a [contact transducer] *reader* provided in said reception block, said [transducer] *reader* being able to translate the relief surface texture into an electrical signal;

a random access memory having plural memory locations *for storing plural reference signals,* said random access memory being able to be connected to said [transducer] *reader* when an authorized support object is introduced into said reception block and to receive and store *as one of said reference signals* in one of said memory locations the corresponding electrical signal delivered by the [transducer] *reader;*

a comparison circuit connected between the memory and the [transducer] *reader,* said comparison circuit determining the degree of coincidence between the *electrical* signal supplied by the [transducer] *reader* when a random support object is introduced into the reception block and each of said *reference* signals stored in the memory locations of the memory; and

a circuit connected to said comparison circuit and supplying, when a predetermined degree of coincidence is adequate, a signal initiating an access control action.

PLANT PATENTS

GRANTED MARCH 12, 1991

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,466

GERBERA PLANT 'MATADOR'

Th. A. Segers, Hoofddorp, Netherlands, assignor to Twyford Plant Laboratories, Inc., Santa Paula, Calif.

Filed Feb. 28, 1989, Ser. No. 317,165

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. The new distinct variety of Gerbera plant herein described and illustrated and identified by the characteristics enumerated above.

7,467

REGAL PELARGONIUM 'ALLURE'

Richard Craig, State College, Pa., and Glenn G. Hanniford, Worthington, Ohio, assignors to Research Corporation Technologies, Tucson, Ariz.

Filed Apr. 10, 1989, Ser. No. 337,781

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct cultivar of regal Pelargonium substantially as illustrated and described herein, particularly characterized as being compact and self-branching, early flowering, and having flowers which are soft pink in color with red feathering on the upper two petals thereof.

7,468

CHRYSANTHEMUM PLANT NAMED 'ALOUETTE'

Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Sep. 18, 1989, Ser. No. 409,455

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct Chrysanthemum plant named Alouette, as described and illustrated.

7,469

CHRYSANTHEMUM PLANT NAMED MIRAMAR

Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Oct. 2, 1989, Ser. No. 415,920

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct Chrysanthemum plant named Miramar, as described and illustrated.

7,470

CHRYSANTHEMUM PLANT NAMED FORGE

Cornelis P. VandenBerg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed Oct. 2, 1989, Ser. No. 416,668

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct Chrysanthemum plant named Forge, as described and illustrated.

7,471

GUZMANIA PLANT NAMED RANA

Gerardus J. Bak, AA Assendelft; Nicolaas D. Steur, JL Oude Niedorp, and Elly Bak, AA Assendelft, all of Netherlands, assignors to Corn. Bak B.V., Netherlands

Filed Jun. 1, 1989, Ser. No. 360,011

Int. Cl.[5] A01H *5/00*

U.S. Cl. Plt.—89 **1 Claim**

1. A plant of a new and distinct cultivar of Guzmania plant named 'Rana', as illustrated and described.

PATENTS

GRANTED MAR. 12, 1991

ERRATA

For CLASS	See PATENT NO.
425-071	4,998,322
452-125	4,998,323
452-149	4,998,324
350-556	4,998,357
165-133	4,998,580
604-283	4,998,713
272-129	4,998,725
285-322	4,998,831
606-194	4,998,923
604-020	4,998,931
005-424	4,998,939
016-034	4,998,940
016-375	4,998,941
028-245	4,998,942
029-432	4,998,943
042-094	4,998,944
047-001	4,998,945
049-497	4,998,946
052-300	4,998,947
056-012	4,998,948
060-039	4,998,949
060-562	4,998,950
060-608	4,998,951
070-395	4,998,952
070-452	4,998,953
073-863	4,998,954
074-567	4,998,955
076-083	4,998,956
082-117	4,998,957
083-133	4,998,958
084-400	4,998,959
084-622	4,998,960
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101-211	4,998,962
102-275	4,998,963
112-121	4,998,964
112-305	4,998,965
114-270	4,998,966
119-022	4,998,967

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280-777 4,998,999
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279-002 4,999,002
280-103 4,999,003
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350-426 4,999,007
351-113 4,999,008
315-212 4,999,009
356-346 4,999,010
353-014 4,999,011
353-014 4,999,012
356-346 4,999,013
356-382 4,999,014

366-176 4,999,015
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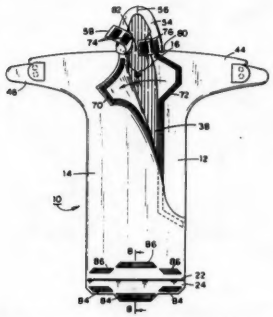
408-241 4,999,018
411-512 4,999,019
417-222 4,999,020
414-415 4,999,021
414-718 4,999,022
439-068 4,999,023
111-007 4,999,057
424-472 4,999,226
235-492 4,999,601

PATENTS

GRANTED MARCH 12, 1991

GENERAL AND MECHANICAL

4,998,296
HYPOTHERMIA PROTECTION SUIT COLLAPSIBLE INTO COMPACT PACKAGE FOR STORAGE
Rebecca M. Stames, 18F Hobbes La., Rochester, N.Y. 14624
Filed Nov. 28, 1989, Ser. No. 442,034
Int. Cl.[5] A41D *13/00, 31/02*
U.S. Cl. 2—69.5 **10 Claims**



1. An integral garment having a skin comprising a layer of open-cell foam material sandwiched between sheets of puncture-resistant and moisture resistant material, wherein;

(a) said skin garment is compressible and air permeable;

(b) said skin of said garment is comprised of a three-layer composite material consisting essentially of a middle layer of said open-cell foam material, a top layer of nonmetallic puncture-resistant and moisture-resistant material, and a bottom layer of nonmetallic puncture-resistant and moisture-resistant material, wherein said middle layer of open-cell foam material is contiguous with both said top layer of puncture-resistant and moisture-resistant material and said bottom layer of puncture-resistant and moisture-resistant material;

(c) said skin defines an envelope for receiving the body of an occupant of said protective garment, wherein said envelope has;

1. a front and a back which extends from a top to a bottom,
2. opposite side edges,
3. an entry flap extending longitudinally along said front,
4. means along said entry flap for closing said envelope,
5. arms extending from opposite sides of said envelope,
6. hand exit slots near the end of said arms on the same side of the envelope as said entry flap,
7. means for closing said hand exit slots,
8. an opening across said bottom of said envelope, and
9. means for closing said opening across said bottom of said envelope.

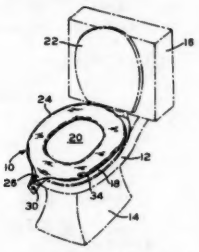
4,998,297
SANITARY TOILET SEAT COVER
Jeanie Summerville, 6034 Fairfield Ave., Apt. C, Fort Wayne, Ind. 46807
Filed Mar. 6, 1990, Ser. No. 489,380
Int. Cl.[5] A47K *13/14*
U.S. Cl. 4—242 **10 Claims**

1. A sanitary toilet seat cover comprising:

a flexible ring-shaped seat portion having an upper surface and a lower surface and a diametrical axis;

a flap portion extending generally radially outwardly from said seat portion along said diametrical axis;

said cover having a first configuration and a second configuration, where in said first configuration said cover is substantially planar and where in said second configuration said seat portion and flap portion are folded in half along said diametrical axis and rolled up spirally and semi-circumferentially starting from that end of the folded seat portion which is opposite said flap portion; and



releasable fastener means for releasably fastening said flap portion to said seat portion when said seat portion is rolled up, said fastener means including first and second mutually engagable fastening elements, said first fastening element being fixed to said flap portion and said second fastening element being fixed to said seat portion.

4,998,298
KNEELING AID AND METHOD OF USE
Edgar D. Mitchell, P.O. Drawer C, Taos, N. Mex. 87571
Division of Ser. No. 294,688, Jan. 9, 1989, abandoned. This application May 21, 1990, Ser. No. 526,529
Int. Cl.[5] E03D *11/00*
U.S. Cl. 4—254 **1 Claim**

1. A method of utilizing a conventional water closet toilet bowl to permit sanitary usage thereof as a male urinal without modification of the bowl or its plumbing attachments and with minimal spillage of urine on the floor area adjacent to the water closet toilet bowl with the assistance of a kneeling aid,

said toilet bowl being of the flush-bowl type and having an upper rim upon which a seat and cover are normally pivotally mounted, said kneeling aid including a single knee support elevated to a convenient height between the floor and the rim of the toilet bowl and an upright standard extending above the single knee support and from one side thereof with a hand grip at the top of the upright standard,

said method comprising the steps preformed by a male of positioning the kneeling aid on the floor adjacent to and to one side of the toilet bowl with the knee support between the toilet bowl and the upright standard,

facing the toilet bowl,

grasping the hand grip on the top of the standard with one hand and lowering himself to one knee on his side adjacent to the hand grasping the hand grip until the knee rests on the single knee support,

urinating into the toilet bowl from a kneeling position slightly above the rim of the toilet bowl,

and upon completion of voiding the bladder rising from the kneeling position to a standing position with the aid of the hand grip on top of the standard.

4,998,299

TOILET WITH APPARATUS FOR EVACUATING MALODOROUS AIR FROM THE BOWL

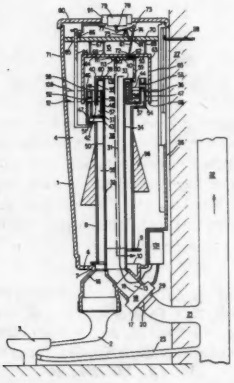
Heinrich Menge, Pferdeweg 45, D-2100 Hamburg 36, Fed. Rep. of Germany

Filed Mar. 6, 1990, Ser. No. 491,478

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1989, 3907214

Int. Cl.[5] E03D *9/52*

U.S. Cl. 4—349 **31 Claims**



1. A toilet comprising a bowl; means for discharging waste from said bowl; a refillable tank for a supply of flushing liquid which normally fills the tank to a predetermined level; combined liquid-admitting and odor-evacuating conduit means connecting said tank with said bowl; a normally closed valve provided in said tank to seal said conduit means from the supply of flushing liquid, said valve including a duct having a first end in communication with said conduit means and a second end in said tank above said level user-operated means for opening said valve including means for displacing said duct relative to said tank to thereby open said valve; and means for evacuating malodorous air from said bowl, including a pipe having an air intake in said tank above said level adjacent said second end of said duct and an outlet outside of said tank, means for drawing air from said bowl by way of said duct and said pipe, a liquid-containing odor barrier between said second end of said duct and said intake, said odor barrier comprising sealing means for sealing said intake, and means for lifting said sealing means to thus establish a path for the flow of air from said bowl into said outlet.

4,998,300

BIDET AND TOILET BOWL CLEANER DEVICE

Saeed Sharifzadeh, 327 Rockland Way, Lawrenceville, Ga. 30245

Filed Dec. 22, 1989, Ser. No. 454,932

Int. Cl.[5] A47K *3/20*

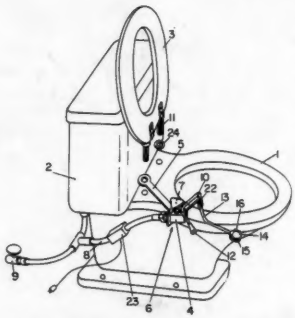
U.S. Cl. 4—420.4 **7 Claims**

1. Dual function, Bidet and toilet bowl cleaner attachment comprising:

(a) a rearward mounting bracket for attachment to a toilet bowl, a pressure regulator body having a pressure regulator valve means therein, said pressure regulator body being mounted on said bracket;

(b) a water supply line connected between a toilet tank and a tank water supply valve and supplying water to said pressure regulator body;

(c) a control arm lever pivotally mounted to said pressure regulator and a water-carrying forward support line connected at one end to an outlet side of said pressure regulator body, a water-carrying arm pivotally connected to the other end of said water-carrying forward support line, said water carrying arm have a lever thereon, a linkage extending between said control arm lever and said lever in



order to move said water-carrying arm from a retracted position under a side portion of a bowl rim to a position wherein a terminal end of said water-carrying arm is approximately centrally located in a bowl; said water-carrying arm terminating in a upward spray nozzle and a lower spray nozzle with said upward spray nozzle and said lower spray nozzle being separated by a valve means that may be turned to a first position to activate said upward spray nozzle only and may be turned to a second position to activate said lower spray nozzle only and may be turned to a third position to activate both said upper spray nozzle and said lower spray nozzle simultaneously.

4,998,301

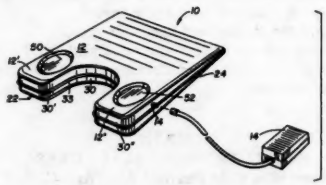
COLLAPSIBLE BED-PAN SUPPORT FOR INVALIDS

Robert Markus, 512 Monterey La., #A, San Clement, Calif. 92672

Filed Nov. 27, 1989, Ser. No. 441,330

Int. Cl.[5] A61G *9/00*

U.S. Cl. 4—457 **3 Claims**



1. A collapsible bed-pan support for bed-ridden persons, and the like, comprising:

an upper body-supporting surface having a head-end and a feet-end;

a lower flat surface for resting on a bed, or the like having a head-end and a feet-end;

an annular surface connecting said upper body-supporting surface and said lower flat surface together and defining a substantially hollow interior that may be inflated for erect-

ing the bed-pan support, said annular surface comprising a front surface;

one of said surfaces having means for injecting aN inflating gas into said substantially hollow interior;

said upper body-supporting surface being sloped and inclining upwardly in a direction from said head-end toward said feed-end;

means for spacing said upper body-supporting surface from said lower flat surface, said means for spacing comprising an upper portion connected to the interior surface of said upper body-supporting surface and a lower portion connected to the interior surface of said lower flat surface; said means for spacing mounting said upper body-supporting surface with respect to said lower flat surface, when the bed-pan support is inflated, such that said upper body-supporting surface slopes and inclines upwardly in a direction from said head-end thereof toward the feet-end thereof, so that the patient under whom the bed-pan is placed has his body gradually elevated from the back toward the thighs;

said front surface of said annular surface defining a substantially U-shaped cutout for receiving and supporting a bed-pan;

said upper body-supporting surface comprising pair of troughs, one on one lateral side of said U-shaped cutout, and the other on the other lateral side of said U-shaped cutout, for supporting and resting thereon a thigh of the patient.

4,998,302

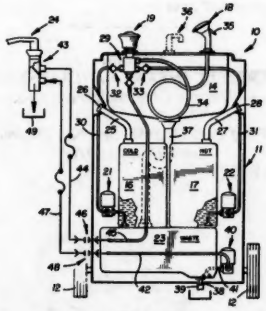
SELF-CONTAINED MOBILE HYGIENE CABINET

Michael L. Silva, 16900 Old Ranch Rd., Los Gatos, Calif. 95030

Filed Jul. 14, 1989, Ser. No. 379,912

Int. Cl.[5] A45D *19/04*

U.S. Cl. 4—516 **12 Claims**



1. A self-contained mobile hygiene cabinet having a front, back and lateral sides comprising

a housing assembly mounted on a plurality of wheels, casters or the like,

a wash basin mounted on a top of said cabinet,

first tank means mounted in said cabinet for retaining a predetermined quantity of relatively cold water therein,

second tank means mounted in said cabinet for retaining a predetermined quantity of relatively hot water therein, said first and second tank means mounted in side-to-side relationship and centrally within said cabinet,

third tank means communicating with said basin for receiving waste waters therefrom, said third tank means mounted below said first and second tank means and closely adjacent to a bottom of said cabinet,

water dispensing means mounted on said cabinet, adjacent to said basin, for receiving and dispensing water therefrom,

water distribution means for selectively communicating water to said water dispensing means,

each of said first tank means and said second tank means being connected to said distribution means by a pump,

first means mounted on said cabinet and leading a supply conduit connected to said water distribution means for connecting a hose of an external water source thereto,

said distribution means will selectively communicate cold water from said first tank means, hot water from said second tank means or a mixture of cold and hot water from a conventional pressurized mixing faucet external of said cabinet, to said water dispensing means such that said cabinet may be used in a location near a pressurized water source via said first means or remote from a water source via said first and second tank means,

second means mounted said cabinet and connected to an exhaust conduit connected to said third tank means for connecting a hose thereto for purging waste waters from said third tanks means, and

pump means mounted in said cabinet for pumping waste water from said third tank means through said exhaust conduit.

4,998,303

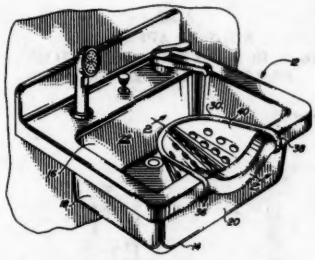
HEAD SUPPORT FOR SALON BASIN

Scott T. Smithers, 2277 Montgomery, Cardiff by the Sea, Calif. 92007

Filed Aug. 21, 1989, Ser. No. 395,984

Int. Cl.[5] A45D *44/10*

U.S. Cl. 4—523 **10 Claims**



1. A head support for a person's head which support is detachably securable to a sink having a vertical wall with an upper edge, said head support comprising:

(a) a frame having a pair of transversely spaced-apart hanger members adapted to engage the upper sink edge;

(b) a headrest plate supported on said frame in a position of use over said sink, said headrest plate being generally transversely concave adapted to engage and support the back of the person's head, said headrest plate being downwardly and forwardly inclined from said frame to a forward edge, at least a portion of said forward edge being spaced from said sink wall in a position of use; and

support means associated with said plate and engageable with and adjustable with respect to an inside of said vertical sink wall to support said frame in a generally horizontal position to at least partially support said head support at said sink wall.

4,998,304

ACCESSORY MOUNTING SYSTEM FOR SHOWER DOOR FRAME

Bruce M. Sauter, Schaumburg, and Kevin G. Short, Midlothian, both of Ill., assignors to Sterling Plumbing Group, Inc., Schaumburg, Ill.

Filed Jan. 18, 1990, Ser. No. 467,100

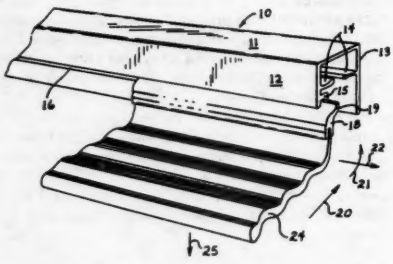
Int. Cl.[5] A47K *3/00*

U.S. Cl. 4—559 **4 Claims**

3. A bathroom accessory mounting assembly comprising:

a shower door frame having a laterally extending header including an external face;

a channel in the external face forming a slot, the slot opening substantially horizontally from the external face and being linear in the lateral direction and upwardly arcuate in a direction inward from the external face;



an accessory support having a rearward flange, the rearward flange being linear from side to side and arcuate from front to back to correspond to the arcuate slot, the rearward flange being rotatably received and retained in the slot;

wherein the header includes a track for guiding the movement of a shower door and the slot is vertically offset from the track.

4,998,305

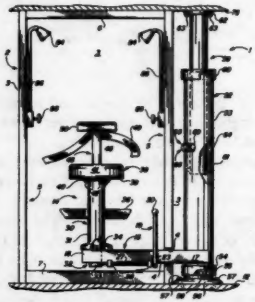
SHOWER APPARATUS

John W. Davis, Rt. 2, Box F, Rayville, La. 71269

Filed Feb. 24, 1989, Ser. No. 314,790

Int. Cl.[5] A47K *3/12*

U.S. Cl. 4—604 5 Claims



1. A shower apparatus and a wheelchair in combination, said shower apparatus mounted adjacent to a shower enclosure in a bathing area having a floor and a ceiling, said shower enclosure further comprising an arm support characterized by a substantially vertically-oriented base column adapted to be rotatably mounted to the floor of the bathing area and a fixed column carried by said base column, with a top end of said fixed column adapted to be fixedly secured to the ceiling of the bathing area; arm means carried by said base column; and seat means upward-standing from said arm means for supporting an occupant and said wheelchair provided with a support having a support contour for receiving said seat means, said wheelchair located in close proximity to said shower enclosure, whereby said seat means and the occupant are selectively maneuvered from the wheelchair into and out of the shower enclosure responsive to rotation of said base column and said arm means with respect to said fixed column.

4,998,306

BUILT-IN SINK

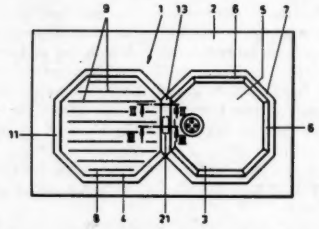
Peter Klimke, and Paul Neubert, both of Gross-Umstadt, Fed. Rep. of Germany, assignors to Resopal GmbH, Gross-Umstadt, Fed. Rep. of Germany

Filed Jul. 31, 1989, Ser. No. 386,774

Claims priority, application Fed. Rep. of Germany, Feb. 11, 1989, 3904121

Int. Cl.[5] A47K *1/04, 1/12*

U.S. Cl. 4—619 7 Claims



1. A sink assembly adapted to be built into a counter, comprising a plurality of modules, at least one of said modules comprising a sink basin having a wall with an overflow adjacent an upper end thereof; each of said modules including an upper edge disposed adjacent an upper edge of another of said modules; said overflow located adjacent one of said adjacently disposed edges, each of said adjacently disposed edges including a joining flange; a connecting strip and a counter-strip disposed, respectively, above and below said joining flanges; connecting means interconnecting said connecting strip and said counter-strip in a manner sandwiching said joining flanges therebetween for securing together said adjacently disposed edges, said counter-strip including a downwardly extending drain underlying said overflow.

4,998,307

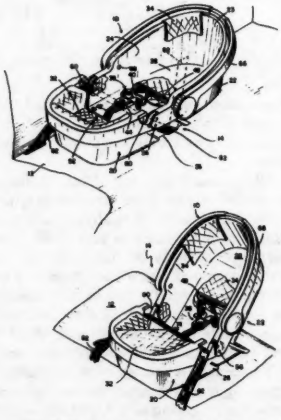
CONVERTIBLE INFANT RESTRAINT DEVICE

Richard E. Cone, Dayton, Ohio, assignor to Cosco, Inc., Columbus, Ind.

Filed Oct. 11, 1988, Ser. No. 256,040

Int. Cl.[5] A47D *7/04*

U.S. Cl. 5—94 11 Claims



3. A convertible infant restraint device for use in a motor vehicle, the device comprising

a tub-like shell assembly that includes a lower supporting surface for supporting an infant and at least two opposite side walls,

the shell assembly having a lower portion and an upper portion, the upper portion being pivotally coupled to the lower portion to permit the upper shell portion to be placed in a plurality of angular orientations with respect to the lower shell portion,

means for locking the upper shell portion and the lower shell portion in a generally planar orientation such that the supporting surface is generally planar and in at least one other angular orientation such that the lower support surface forms an angle less than 180°,

means for elevating a portion of the lower supporting surface when the upper shell portion and the lower shell portion are oriented in the at least one other angular orientating to provide a planar support surface for a lower part of the infant, and

means for securing the infant to the upper shell portion, said elevating means being configured to operate independently of said securing means such that movement of the upper shell portion relative to the lower shell portion does not effect the means for securing the infant.

4,998,308

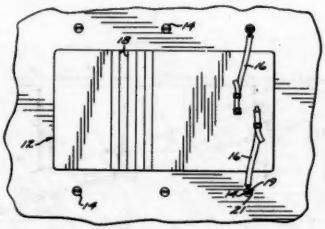
SECLUSION ROOM BED

Frank Farago, 255 Orleans Way, Long Beach, Calif. 90805

Filed Feb. 14, 1990, Ser. No. 479,954

Int. Cl.[5] A61G *7/06*

U.S. Cl. 5—424 **9 Claims**



1. A seclusion room facility, for safely controlling a patient undergoing a violent episode, comprising:

a self-supporting bed wherein all exposed top and side surfaces, edges and corners are pliable and resilient;

a floor, for supporting said bed, having a plurality of substantially flush-mounted floor anchor means therein and positioned adjacent the side surfaces of said bed;

restraint means having a first end attachable to said floor anchor means and a second end attachable to a patient reclined on the top surface of said bed for restraining said patient to said bed.

4,998,309

HEALTH PILLOW

Günter Tesch, Avenue Jean-Marie-Musy 15, CH-1700 Fribourg, Switzerland

Continuation of Ser. No. 272,325, Nov. 17, 1988, abandoned. This application Apr. 30, 1990, Ser. No. 515,342

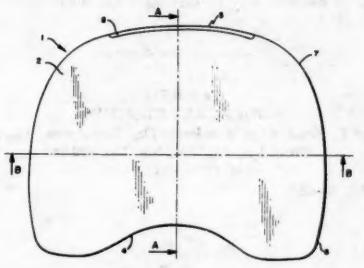
Claims priority, application Fed. Rep. of Germany, Nov. 19, 1987, 3739215

Int. Cl.[5] A47G *9/00*

U.S. Cl. 5—434 **17 Claims**

1. A pillow comprising:

a cover made from an essentially unstretchable fabric, said cover being formed from two halves joined together about their peripheries, each of said halves including a pair of opposing, outwardly curved lateral sides, a first longitudinal side and a second outwardly curved longitudinal side, each of said lateral sides being joined with outwardly rounded corners to said longitudinal sides, said first longitudinal side being longer than said second longitudinal side and includes a centrally located, inwardly directed curved portion extending over a substantial length thereof; and



a filling formed from a spherically intertwined fiber aggregate, said fiber aggregate being compressed within said cover to a pile density of between 30 to 50 g/dm^3.

4,998,310

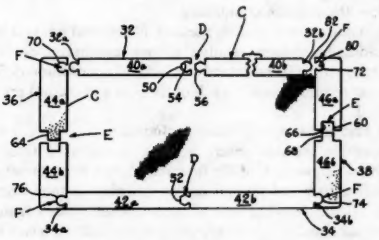
BREAKDOWN AIR MATTRESS ASSEMBLY

Robert V. Olson, 104 Shaw St., Greenville, S.C. 29609

Continuation of Ser. No. 257,713, Oct. 12, 1988, abandoned. This application Jun. 25, 1990, Ser. No. 543,208

Int. Cl.[5] A47C *19/00*

U.S. Cl. 5—449 **16 Claims**



6. In an air mattress assembly, the combination comprising:

a pair of air mattresses adapted to be arranged side-by-side defining a longitudinal joint between said air mattresses;

a deck of resilient foam material for surrounding the perimeter of said air mattresses when arranged side-by-side;

a cover in which said air mattresses and deck may be secured;

said deck including a first side wall carried near a first outer wall of said air mattresses, a second side wall carried near a second outer wall of said air mattresses generally parallel to said first outer wall;

a front wall carried near a third outer wall of said air mattresses, and a back wall carried near a fourth outer wall of said air mattresses;

joint means for joining said first and second side walls, and said front and back walls together to form a deck generally flush with said air mattresses around said outer perimeter of said air mattresses;

web means integrally attached to front and back walls of said perimetal deck laterally bridging said longitudinal joint between said air mattresses along generally the entire length of said air mattresses to effectively isolate the sight and feel of said longitudinal joint underneath said cover, and to reduce the tendency of said opposing walls to spread apart;

said first side wall including a plurality of first deck sections;

said second wall including a plurality of second deck sections; said back wall including a plurality of back wall sections; and said front wall including a plurality of front deck sections; and

said web means being individually attached to each of said plurality of said front and back deck sections so that said deck sections may be disjointed for breakdown of said deck.

4,998,311

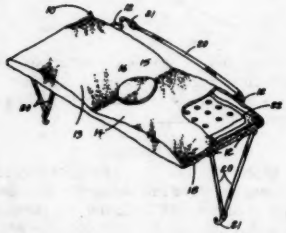
GOLF CART CUSHION

Wilbur L. Ernst, 6136 Woodcrest Dr., Tuscaloosa, Ala. 35405

Filed Apr. 13, 1990, Ser. No. 509,065

Int. Cl.[5] A47C *27/10*

U.S. Cl. 5—455 **8 Claims**



1. A generally horizontal golf cart cushion for releasable securement to an associated golf cart, wherein the golf cart includes a generally horizontal platform for receiving the cushion, the cushion comprising,

a first and second pocket, the first and second pockets longitudinally aligned relative to one another, including a transverse seam directed medially of the cushion defining rear terminal ends of each of the first and second pockets, and

the first and second pockets including a

respective cushion insert housing mounted within each pocket, wherein each of the first and second pockets defines a respective first and second pocket opening formed coextensively with a forward end of each pocket spaced from the transverse seam to selectively receive the cushion insert housing within each pocket, and strap means having a first end portions attached to said cushion adjacent said pocket openings, the strap means having second end portions with means adapted to connect the second ends of the strap portions to an associated golf cart.

4,998,312

TOOL FOR FORM STAKE REMOVAL

Andrew H. Donaldson, 2724 Bonnie Dr., Santa Clara, Calif. 95051

Filed Oct. 11, 1989, Ser. No. 419,906

Int. Cl.[5] B25F *1/00*

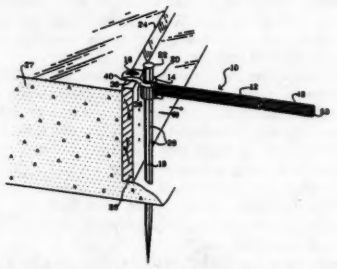
U.S. Cl. 7—166 **12 Claims**

1. A stake pulling device for removing form stakes from concrete forms, comprising,

an elongated rod serving as a lever arm and having a forward end and a rearward end,

a stake engaging head secured to the forward end of the elongated rod, the stake engaging head having a bore extending through the head generally at right angles to the length of the elongated rod, and of a diameter to accommodate a form stake through the bore, the bore being in a position which is fixed with respect to the elongated rod, and

means associated with the bore for gripping a metal form stake when the stake is in the bore and the lever arm is



pulled upwardly, so that the stake can be rotated and pulled upwardly by the stake pulling device.

4,998,313

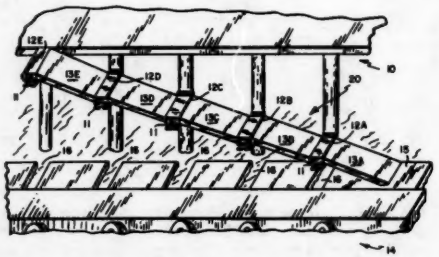
SELF-ADJUSTING VARIABLE HEIGHT GANGWAY SYSTEM

Sandra M. Lippka, Warwick, R.I., and Carl R. Peterson, Boxford, Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation of Ser. No. 163,977, Mar. 4, 1988, abandoned. This application Jul. 13, 1989, Ser. No. 380,710

Int. Cl.[5] E01D *1/00*

U.S. Cl. 14—71.1 **8 Claims**



1. A system for providing access between a pier structure and a dock structure each having surfaces which are relatively movable with respect to each other over a range of motion determined by a range of tidal motions, said system comprising

a plurality of platform members;

a plurality of ramp members hingedly coupled to said platform members so as to form a gangway comprising a series of alternating ones of said platform and ramp members, said gangway being positioned between said pier and dock structures, the ends of the gangway being in contact with said structures;

a plurality of support members fixed in position relative to said pier structure beneath said gangway and positioned at predetermined vertical locations along the length of said pier structure beneath said platform members;

an access surface at said dock structure having a plurality of openings at locations along the length thereof corresponding to the locations of said support members;

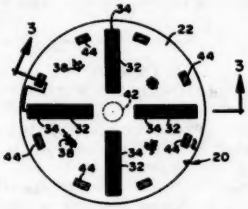
means for causing said support members to support one or more of said platform members so that one or more of said ramp and platform members come to rest one said access surface adjacent the surface of said dock structure and one or more of said support members pass through said openings as said pier and dock structures move relative to one another over range of tidal motion.

4,998,314

COMBINATION OF A BONNET AND A BASE MEMBER FOR A ROTARY CLEANING MACHINE

Gary R. Borofsky, Rydal, Pa., assignor to Bonnit Brush Systems Co., Huntingdon Valley, Pa.

Filed May 10, 1989, Ser. No. 349,689
Int. Cl.[5] A47L *11/14, 11/162*
U.S. Cl. 15—4 16 Claims



1. A combination of a bonnet and a base member for a rotary cleaning machine, said combination comprising.

a base member for attachment to a drive shaft of the rotary cleaning machine;

a brush member releasably positioned on said base member; and

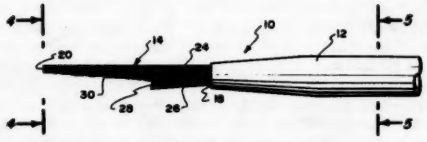
a bonnet constructed of flexible material including an opening extending therethrough and correspondingly sized and positioned to receive said brush member, said bonnet being positioned on said base member such that a portion of said brush member extends through said bonnet opening whereby a cleaning surface is formed by the combination of the brush member and bonnet and wherein the brush member and bonnet are independently replaceable.

4,998,315

NAIL POLISH BRUSH

Barbara A. Pessis, 1245 W. Laurel Ave., Apt. 14, Los Angeles, Calif. 90046

Continuation-in-part of Ser. No. 162,661, Mar. 1, 1988. This application Jan. 12, 1990, Ser. No. 464,392
Int. Cl.[5] A46B *9/00*
U.S. Cl. 15—160 6 Claims



1. An improved nail polish brush comprising:

an elongated handle, said handle terminating in a pair of ends;

a bristle body having a proximate edge, said proximate edge being fixedly secured to said handle at a said end, said bristle body extending outward from said end defining a distal edge, said bristle body being formed of a mass of bristles, said bristle body also having an inferior surface adapted to be placed in contact with a nail on which polish is to be applied, the improvement comprising:

said bristles assuming a variety of different lengths, said inferior surface defining a ledge, said ledge defining a surface located transverse to the longitudinal axis of each of said bristles, whereby said ledge functions to locate the polish in the outer portion of said bristle body decreasing the accumulation of polish at said proximate edge.

4,998,316

CIRCULAR RING SHAPED BRUSH SECTION FOR SWEEPING MACHINE

Kim F. Maltarp, Hvidore 35, DK 6580 Vamdrup, Denmark

Filed May 2, 1989, Ser. No. 346,550
Claims priority, application Denmark, May 3, 1988, 2382/88
Int. Cl.[5] A46B *3/14*
U.S. Cl. 15—181 18 Claims

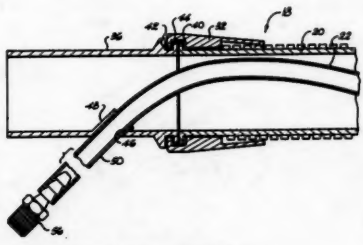
1. Circular ring shaped brush section with internal diameter d and external diameter D_1 for mounting on a shaft on which a number of brush sections can be mounted, so that together they form a cylindrical brush and which consists of a number of mainly radially oriented creased wires which have an approximate length of $D_1=d$ and are folded at the middle to a U-shape, and by a circular ring with an internal diameter d and external diameter D_2 which is clamped round the wires in the brush section characterized by the fact that the individual wires in the brush section are held together mutually in a continuous hub in an area close to the internal periphery of the brush section by a hub-shaped layer (7) of thermoplastic material, the hub having an internal diameter d and an external diameter D_3 the external diameter D_3 of the hub being at least as large as the external diameter D_2 of the ring, the individual wires in the brush section further being held together by the circular ring, said circular ring being clamped around the hub of the thermoplastic material such that the individual wires extend outwardly from the thermoplastic material and such that the individual wires are prevented from contacting the circular ring.

4,998,317

COMBINED VACUUM AND FLUID LINE HOSE

Renold R. Passien, 8910 Hwy. 66, Klamath Falls, Oreg.

Filed Jul. 13, 1989, Ser. No. 380,154
Int. Cl.[5] A47L *9/24*
U.S. Cl. 15—321 13 Claims



1. A cleaning attachment, comprising:

a vacuum hose having a dispensing fluid line retained

therein, with one end of said hose adapted for association with a vacuum cleaner/ heated fluid dispensing apparatus, and the other end of said hose adapted for association with a cleaning tool; and

a swivel coupling member rotatably retained at one end of said vacuum hose, and adapted to be detachably connected to one of a vacuum cleaner/heated fluid dispensing apparatus and a cleaning tool;

wherein said swivel coupling member has an opening formed in the wall thereof through which an end portion of the dispensing fluid line exits, and is rotatably received therein, whereby the vacuum hose and fluid line are prevented from twisting and coiling as the cleaning tool is manipulated during cleaning operations.

4,998,318

KNOB DEVICE

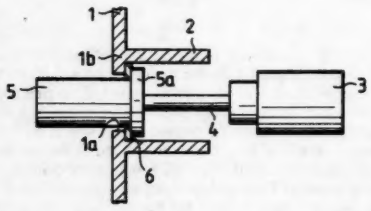
Nobuo Nohtomi, and Hideaki Saito, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Oct. 26, 1989, Ser. No. 426,645

Claims priority, application Japan, Mar. 10, 1989, 64-26586[U]; Mar. 10, 1989, 64-26587[U]; Mar. 10, 1989, 64-26588[U]

Int. Cl.[5] E05B *1/00*

U.S. Cl. 16—121 **18 Claims**



1. A knob device, comprising:

an operating member;

a push button mounted on said operating member and having a first flange;

an escutcheon in which said first flange is received, said escutcheon having a second, inner flange at its front end which contacts said first flange; and

a sheet disposed between said first flange and said second flange and interposed between said push button and said escutcheon, said sheet having a plurality of small projections formed on at least one of inner and outer peripheries of said sheet.

4,998,319

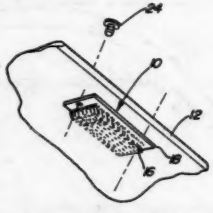
CARPET GRIPPING DEVICE FOR USE UNDER AN OVERLAYED FLOOR COVERING

Christopher Ford, 34432 Jefferson, Ste. 14, Mt. Clemens, Mich. 48045

Filed May 31, 1989, Ser. No. 359,322

Int. Cl.[5] B32B *3/06*; A47G *27/04*

U.S. Cl. 16—8 **9 Claims**



1. A carpet-gripping device for inhibiting relative movement between an overlayed floor covering and a carpeted floor beneath the overlayed floor covering, comprising:

a generally flat base member;

a plurality of substantially rigid prongs extending from one side of the base member, the prongs having a predetermined, bent, angular shape and the exposed end of each prong cut to provide a flat end surface such that said plurality of prong flat end surfaces are in substantially the same plane forming a generally smooth surface; and

means for securing the base member to an overlayed floor covering.

4,998,320

APPARATUS FOR MOVABLY SUPPORTING BEDS AND THE LIKE

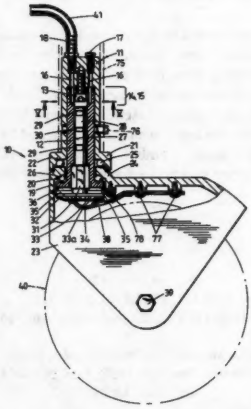
Hans-Willi Lange, Wermelskirchen, Fed. Rep. of Germany, assignor to Albert Schulte Söhne GmbH. & Co., Wermelskirchen, Fed. Rep. of Germany

Filed Nov. 1, 1989, Ser. No. 431,441

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1988, 3837307

Int. Cl.[5] B60B *33/00*

U.S. Cl. 16—35 R **21 Claims**



1. Supporting apparatus for mobile commodities, such as hospital beds, comprising ground-contacting means including a plurality of casters each having a wheel, a frame mounting the wheel for rotation about a first axis and a carrier having a cylinder and mounting the frame for rotation about a second axis substantially at right angles to the first axis; and means for controlling the movements of said frames and said wheels about the respective axes, comprising a discrete liquid-operated plunger reciprocably mounted in the cylinder of each carrier for movement between a plurality of positions, a discrete brake provided on each frame to engage the respective wheel in response to movement of the respective plunger to a first position, a discrete blocking device for each of said frames, each blocking device being operative to prevent rotation of the respective frame in response to movement of the respective plunger to at least one second position, and means for moving the plungers between said positions including motors having means for supplying metered quantities of liquid to said carriers, each of said motors comprising a discrete cylinder and piston unit, means for displacing the piston with reference tot eh cylinder of the respective unit, and discrete means for conveying liquid between the cylinders of said carriers and the cylinders of the respective units in response to displacement of pistons of said units, said displacing means comprising a common indexible displacing member for the

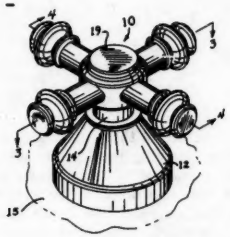
pistons of said units, and units including a first and a second unit and said displacing member being disposed between said first and second units, at least one of said brakes being disengaged and the respective blocking device simultaneously permitting rotation of the respective frame in a third position of the respective plunger.

4,998,321

HANDLE ASSEMBLY

Thomas E. Gaffney; Clarence E. Klessig, both of Sheboygan; Alan J. Weir, New Holstein, and Stanley M. Grycan, Sheboyan Falls, all of Wis., assignors to Kohler Co., Kohler, Wis.

Filed Jan. 17, 1990, Ser. No. 466,164
Int. Cl.[5] A47B 95/02
U.S. Cl. 16—110 R **7 Claims**



1. A handle assembly connectable to a stem, comprising:
an open-ended sleeve which is connectable to the stem by a fastener inserted and removed through the open end, the sleeve having at least four cross openings near the open end;
a cap portion that covers the open end and has at least four cross openings aligned with the cross openings of the sleeve;
a first cross member engageable in two of the cross openings of the sleeve and two of the cross openings of the cap portions;
a second cross member engageable in the other two cross openings of the sleeve and the other two cross openings of the cap portion; and
means for interfitting the first cross member with the second cross member inside sleeve such that one cross member crosses past the other cross member inside the sleeve.

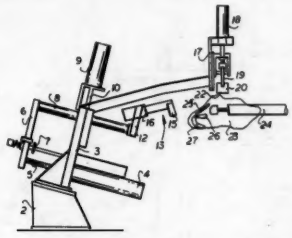
4,998,322

SYSTEM FOR DEWINGING FOWL

Daniel Villemin, Chennevieres sur Marne; Janusz Plusa, Champigny sur Marne; Daniel Guilbaud, Saint Fulgent, and Jean Leclere, Creteil, all of France, assignors to Etablissements Arrive S.A., Saint Fulgent and Union Financiere Pour le Developpement de L'Economie Cerealiere - Unigrains, Paris, both of, France

Filed Jan. 12, 1990, Ser. No. 464,515
Claims priority, application France, Jan. 13, 1989, 89 00569
Int. Cl.[5] A22C 21/00
U.S. Cl. 452—71 **8 Claims**

1. An apparatus for dewinging a bird, the apparatus comprising:
a generally stationary base;
means for holding the bird to be dewinged stationarily adjacent the base;
a carriage longitudinally displaceable forward on the base;
means for displacing the carriage relative to the base longitudinally forward toward the bird and backward away from the bird;
a pair of transversely spaced and transversely displaceable grippers carried on the carriage engageable around wings of the bird on the holding means when the carriage is displaced forward adjacent the bird;
means for closing the grippers on the wings; and



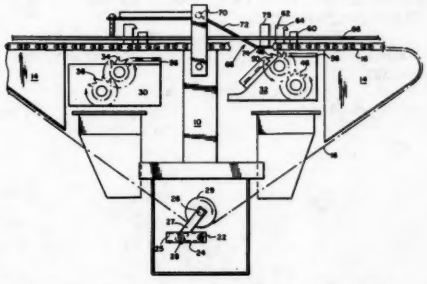
means for transversely displacing the grippers apart after closing of same for tearing the wings from the bird on the holding means.

4,998,323

POULTRY BREAST AND BACK SKINNER

Eugene Martin, Ephrata; Harold Martin, Lancaster, and Michael E. Lease, Kinzers, all of Pa., assignors to Foodcraft Equipment Co., Lancaster, Pa.

Filed Jan. 30, 1990, Ser. No. 472,049
Int. Cl.[5] A22B 5/16
U.S. Cl. 452—125 **12 Claims**



1. In an automatic skinner comprising a peeling roll and a stripper roller, each having plural spaced tooth blades, the blades of the two rolls being interleaved, and means for driving the rolls in the same direction, the improvement wherein the teeth of the peeling roll face in their direction of motion, and the teeth of the stripper roll face away from their direction of motion.

4,998,324

ANIMAL INTESTINE INCISING APPARATUS

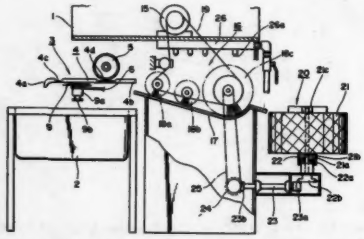
Toshihiro Nagatomo, Miyazaki, Japan, assignor to Seicon Co., Ltd., Miyazaki, Japan

Filed Feb. 27, 1990, Ser. No. 485,463
Int. Cl.[5] A22C 17/16
U.S. Cl. 452—149 **9 Claims**

1. An apparatus for incising animal's intestines comprising:
a guide means to be inserted at a top end into animal's intestines for guiding said intestines backward along a circumferential surface of said means,
a pair of rotary transportation means disposed along both longitudinal sides of said guide means for seizing and backwardly transporting the intestines,
an incising means disposed above and spaced apart from the circumferential surface of said guide means for longitudi-

nally incising an upper surface of said intestines when they are transported backward,

a cutting means disposed below and spaced apart from said guide means for cutting to remove a fat layer deposited on a lower surface of said intestines,



a cleaning means disposed downstream to said guide means for cleaning the intestines after incision and removal of said fat layer, said cleaning means comprising at least one rotary brushing means and at least one water spray means each disposed along and above a path way of the intestines transported from said guide means.

4,998,325

CARD HAVING A TRANSVERSE CONVEYOR WITH A TRAPEZOIDALLY CROSS-SECTIONED SHOULDER, FOR CONVEYING A WEB LATERALLY AWAY FROM THE CARD

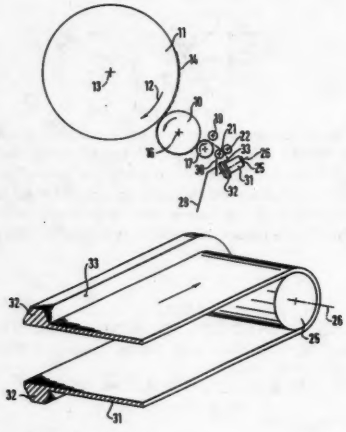
Paul Stäheli, Wilen, and Giuseppe Verzilli, Wiesendangen, both of Switzerland, assignors to Rieter Machine Works, Ltd., Winterthur, Switzerland

Filed Aug. 16, 1989, Ser. No. 394,590

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1988, 3827822

Int. Cl.[5] D01G *15/46, 15/02*

U.S. Cl. 19—106 R **7 Claims**



1. A card comprising

a swift for carding fibers;

a pair of rollers defining a nip therebetween;

a doffer for transferring carded fibers from said swift to said nip to form a fiber web; and

a transverse conveyor spaced from said rollers having a top run for receiving a fiber web from said nip of said rollers, said top run extending in parallel to said rollers to turn the web in a different toward one end of said rollers and having a shoulder extending longitudinally thereof on a side facing said swift for guiding the fiber web.

4,998,326

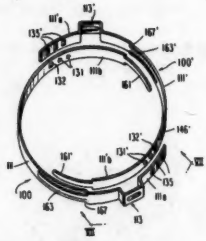
BALANCED CLAMP STRUCTURE

Hans Oetiker, Horgen, Switzerland, assignor to Hans Oetiker AG Maschioen- und Apparatefabrik, Horgen, Switzerland

Filed Dec. 6, 1989, Ser. No. 446,700

Int. Cl.[5] B65D *63/00*

U.S. Cl. 24—20 R **43 Claims**



1. A clamp structure of the open type for use on rotating parts, comprising clamping band means adapted to provide overlapping band portions in the installed condition of the clamp structure about an object to be fastened thereby, mechanical connecting means for mechanically connecting overlapping band portions including outwardly extending hook means in an inner band portion operable to engage in aperture means provided in an overlapping outer band portion, two ear means in said clamping band means which are located at least approximately diametrically opposite one another, at least one of said ear means being plastically deformable for tightening the clamp structure about the object to be fastened thereby after engagement of the outwardly extending hook means in the aperture means, and further means including an opening in at least the outer band portion to compensate for imbalances in the clamp structure.

4,998,327

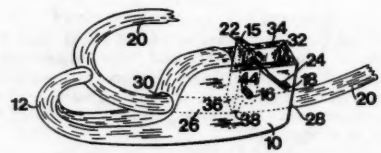
TRACTION HOOK AND ROPE LOCK

Harold L. Hull, 401 Canyon Way #43, Sparks, Nev. 89434, and Kenneth W. Buethe, 906 Humboldt, Reno, Nev. 89509

Filed Apr. 11, 1990, Ser. No. 507,634

Int. Cl.[5] F16G *11/00*

U.S. Cl. 24—134 R **8 Claims**



1. A combination traction hook and rope lock comprising; a body member, said body member having a channel with an entrance and an exit for a traction rope, said body member having a hook on one of its ends, said exit from said channel of said body member being located between said entrance and said hook, said body member having a cavity opening into said channel, said cavity having substantially two parallel side walls, a first pivotable member, said first pivotable member being mounted in said cavity by a support pin, said support pin penetrating substantially the center portion of said first pivotable member with the distal ends of said support pin being supported by said parallel side walls of said cavity, said first pivotable member having a first and second end, said first end having a rope engaging surface, said second end having lock-

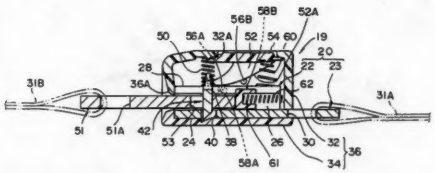
ing means cooperating with a second pivotable member, said second pivotable member being substantially a wire formed in the shape of a square U with the ends of said wire turning inward toward each other to form a mounting means, said mounting means cooperating with bearing means in said parallel side walls of said body member, said first pivotable member having a locked position and an un-locked position, said first pivotable member when being in said locked position urging said first rope engaging surface of said first pivotable member against said traction rope, whereas said traction rope is held and locked in a secure manner and when said first pivotable member is in its said un-locked position said traction rope is free in said channel.

4,998,328

BUCKLE DEVICE

Kohbun Tanaka, Niwa, Japan, assignor to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Aichi, Japan

Filed Jul. 7, 1989, Ser. No. 376,586
Claims priority, application Japan, Jul. 8, 1988, 63-90589[U]
Int. Cl.[5] A44B *11/26*
U.S. Cl. 24—639 **20 Claims**



1. A buckle device, comprising:

a body member;

a locking member which can move between a lock position and a release position;

a lever member which has a first end and a second end as well as a middle section situated therebetween, said first end contacting said locking member, said lever member being supported on said body member so as to pivot using infinitesimally consecutive points on said middle section of said lever member as fulcrums, such that though depression of said second end said locking member can be moved from said lock position to said release position; and

a displacement section which is provided on said middle section of said lever member, said displacement section having a smoothly curved section extending from said first end to said second end on a lower side of said lever member so as to enable a point of contact to act as a fulcrum point with said body member and to move in such a manner that said fulcrum point is displaced from proximate said first end to proximate said second end as said second end of said lever member is depressed so that a ratio of displacement of said first end with respect to said second end is continuously increased as said second end is depressed.

4,998,329

CONVERTIBLE FOOTWEAR

Leslie A. Boros, 7074 E. Aster Dr., Scottsdale, Ariz. 85254

Continuation-in-part of Ser. No. 105,715, Oct. 6, 1987, Pat. No. 4,839,948, which is a continuation-in-part of Ser. No. 866,777, May 23, 1986, abandoned, which is a continuation of Ser. No. 681,844, Dec. 14, 1984, abandoned. This application Jun. 19, 1989, Ser. No. 369,086
Int. Cl.[5] A41F *1/00*
U.S. Cl. 24—662 **4 Claims**

1. A clasp for detachably securing a first member to a second member, said clasp comprising:

(a) a female element couplable to said first member and including

(i) an open end,

(ii) a closed end spaced from the open end,

(iii) a pair of spaced apart edgewalls,

(iv) a first sidewall having

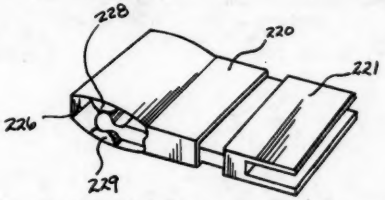
a first portion integral with said pair of edgewalls along a length thereof adjacent said open end, and

a second portion integrally extending from said first portion toward said closed end and independent said pair of edgewalls, and

(v) a second sidewall having

a first portion integral with said pair of edgewalls along a length thereof adjacent said open end, and

a second portion integrally extending from said first portion toward said closed end and independent said pair of edgewalls;



(b) a male element including

(i) a first end couplable to said second member, and

(ii) a second end spaced from said first end and receivable through the open end of said female element; and

(c) detent means for selectively and detachably retaining said male element within said female element, said detent means comprising an engagement pair including

(i) first engagement means carried by said female element at a location closer to said closed end than to said open end, and

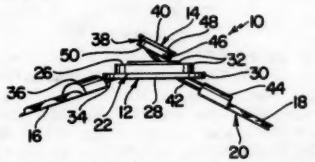
(ii) second engagement means matingly engageable with said first engagement means and carried by said male element at a location closer to the second end thereof than to the first end thereof.

4,998,330

JEWELRY CLOSURE DEVICE

William M. D'Amore, Jr., 37 Carlson Cir., West Warwick, R.I. 02893

Filed Apr. 9, 1990, Ser. No. 506,709
Int. Cl.[5] A44B *11/00*
U.S. Cl. 24—700 **5 Claims**



1. A jewelry closure device for securing opposite first and second end portions of a chain-like jewelry item comprising an outer element and a central element, said outer element including a frame portion having front and rear sides and having an open unobstructed aperture therein of non-circular configuration which extends between the front and rear sides of said outer element, and means for securing said outer element to the first end portion of said jewelry item, said central element including a body portion having front and rear sides and a peripheral edge, said body portion as defined by said peripheral edge being of the same configuration and substantially the same dimension as said aperture, said central element further including a front rim portion projecting outwardly beyond said peripheral edge adjacent the front side of said body portion, and means on the rear side of said body portion for securing said central element to the second end portion of said jewelry item, said aperture and said central element being configured

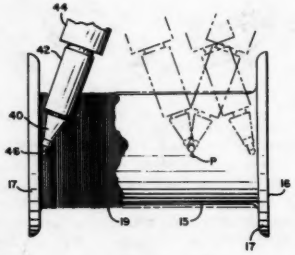
to permit the passage of said central element in a forward direction through said aperture when said central element is in a predetermined non-aligned angular orientation relative thereto, said central element being receivable in an assembled position in said outer element wherein said body portion is received in aligned relation in said aperture and said rim portion engages the front side of said frame portion to prevent the passage of said central element in a rearward direction through said aperture.

4,998,331

APPARATUS FOR REMOVING UNUSED THREAD FROM A SPOOL

Jan E. Westman, Solvesborg, Sweden, assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Dec. 26, 1989, Ser. No. 457,107
Int. Cl.[5] B65H *73/00*
U.S. Cl. 28—295 **15 Claims**



1. Apparatus for removing unused thread from a spool, comprising:

means for holding the spool in position for a thread cutting operation, the spool having a pair of spaced apart flanges interconnected by a core and the means for holding the spool including a pair of opposed locators which protrude into the core adjacent the flanges;

clamping means for clamping the unused thread on the spool during the cutting operation; and

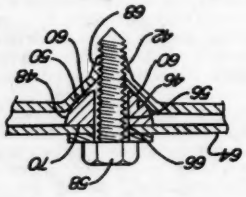
cutting means movable into engagement with the thread and movable axially along the spool for cutting the unused thread, whereby the clamping means is actuated to release and permit the cut thread to separate from the spool.

4,998,332

METHOD FOR BODY PANEL ATTACHMENT

Ernest A. Dacey, Jr., Highland, Mich., assignor to Utica Enterprises, Inc., Sterling Heights, Mich.

Continuation of Ser. No. 306,492, Feb. 6, 1989, abandoned, which is a division of Ser. No. 164,129, Mar. 4, 1988, abandoned. This application Dec. 8, 1989, Ser. No. 449,113
Int. Cl.[5] B21C *37/30*; B24B *39/00*
U.S. Cl. 29—90.01 **14 Claims**



1. A method for forming at least one annular seat in a surface of a member at a predetermined distance from a reference surface, comprising the steps of:

burnishing at least one aperture in said surface of said member such that said surface is caused to flare and form an annular flange around said at least one aperture; and

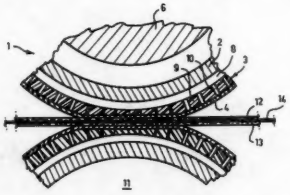
further burnishing said surface to produce said at least one annular seat coaxial with said at least one aperture, said at least one annular seat being burnished into said surface to a depth such that said at least one annular seat is spaced said predetermined distance from said reference surface independent of the distance of said surface of said member from said reference surface.

4,998,333

ROLL FOR THE PRESS IN A PAPER MACHINE OR THE LIKE

Osmo Skyttä, Jyväskylä , Finland, assignor to Oy Tampella AB, Tampere, Finland

Filed May 24, 1989, Ser. No. 356,777
Claims priority, application Finland, Jun. 29, 1988, 883110
Int. Cl.[5] B21B *31/08*
U.S. Cl. 29—130 **4 Claims**



1. A roll **(1)** for a press section of a paper machine, comprising a substantially rigid cylindrical shell body **(2)**; a resilient layer **(3)** fastened to the shell body **(2)** and comprising cavities **(10)** for the compression thereof; and a surface layer **(4)** positioned on the resilient layer **(3)** and fastened thereto, characterized in that the resilient layer **(3)** is formed by longitudinally extending strips made of a resilient material, the longitudinally extending strips being attached to the shell body **(2)** longitudinally of the roll **(1)** and spaced apart from each other so that the distance between adjacent longitudinally extending strips is substantially equal; that the surface layer is fastened to the longitudinally extending strips on to the surface facing away from the shell body **(2)** so that a continuous conduit **(10)** is defined between two adjacent longitudinally extending strips; and that cooling medium is arranged to be introduced into each conduit **(10)** and taken away therefrom through both ends thereof.

4,998,334

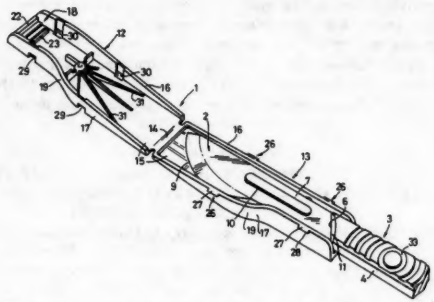
BLADE EXTRACTOR

John H. Pemberton, and Stephen L. Dear, both of Harlow, England, assignors to Swann-Morton Limited, Sheffield, England

Filed Feb. 7, 1990, Ser. No. 477,038
Claims priority, application United Kingdom, Feb. 15, 1989, 8903391
Int. Cl.[5] B23P *19/04*
U.S. Cl. 29—239 **9 Claims**

1. A blade extractor for extracting a blade from a replaceable blade instrument, said extractor comprising upper and lower tabs of length slightly exceeding that of said blade, and of width slightly exceeding that of said blade, side skirts provided on at least one of said tabs, abutment means provided on one of said tabs and said tabs being hinged together and being manually and progressively displaceable from a splayed-apart, open position to a closed position, in which closed position said tabs encapsulate said blade, and lie in substantially parallel planes, with opposite longitudinal edges of said tabs and hence the extractor closed off by said side skirts, and said abutment

means engages a portion of said blade so that, when the user manoeuvers said instrument with respect to said extractor



during said extraction process, said blade is safely encapsulated within said extractor.

4,998,335

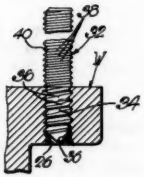
METHOD OF REPLACING A BOLT IN WORK

Gary S. Esposito, 33 Orient La., North Haven, Conn. 06473

Continuation-in-part of Ser. No. 697,757, Feb. 4, 1985, abandoned. This application Aug. 6, 1986, Ser. No. 893,870

Int. Cl.[5] B23P *6/00*

U.S. Cl. 29—402.06 **5 Claims**



1. Method of replacing a bolt in a casting, which comprises removing the bolt from the casting by burning out with flame the mounting shank of the bolt from a tapped hole in the casting so as to avoid complete burn-out of the hole and instead keep a flame's effect on an internal wall and thread of the hole to no more than some mutilation and driving a new bolt with its threaded shank tap-like into the mutilated hole for its secure mount therein, with said shank of the new bolt having first threads of self-tapping type thereon, and said new bolt also having a stem with second threads thereon which remains outside said multilated hole, with said second threads being standard threads different from said first threads.

4,998,336

TRUSS FABRICATION APPARATUS AND METHOD OF MAKING A TRUSS

John Papsdorf, 222 Letts Rd., Lake Orion, Mich. 48035

Filed Feb. 10, 1989, Ser. No. 309,094

Int. Cl.[5] B23P *19/04;* **B65H** *13/00*

U.S. Cl. 29—432 **4 Claims**

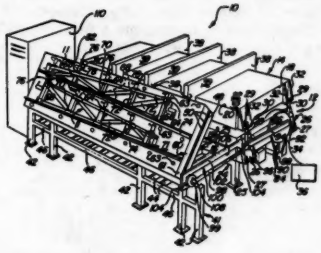
1. A method for fabricating a truss including a plurality of truss components and a plurality of nailers having projections for engaging the truss components at the ends thereof to form a joint, the method comprising the steps of:

placing a table in an inclined position;

loading a plurality of nailers and a plurality of truss components in a predetermined configuration upon a support fixed, said support fixture slidably supported on the table;

moving the table from the inclined position to a horizontal position;

sliding the support fixture on the table horizontally and transversely to a press and placing the support fixture through an opening along one side of the press thereby disposing the support fixture between an upper press platen and a lower press platen of the press; and



moving the upper press platen toward the lower press platen thereby fastening all of the plurality of nailers upon the support fixture simultaneously into the plurality of truss components thereby forming an integral one-piece truss.

4,998,337

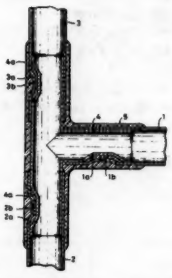
METHOD FOR THE PERMANENT MUTUAL CONNECTION OF ALREADY FINISHED METAL TUBES

Jozef J. Tiekink, Harderwijk, Netherlands, assignor to Reynolds Aluminium Holland B.V., Harderwijk, Netherlands

Filed Sep. 22, 1989, Ser. No. 410,819

Int. Cl.[5] B23P *17/00*

U.S. Cl. 29—527.4 **2 Claims**



1. A method for forming a permanent connection between at least two finished metal tubes comprising: providing a metal body having at least two ends, locating each of said at least two finished metal tubes on one of said at least two ends of said metal body so as to form at least two overlapped body-tube joints, locally depressing a portion of said overlapped body-tube joints so as to form an aperture thereon, molding a liquid plastic material on said overlapped body-tube joints and in said apertures, and setting said liquid plastic material so as to form a permanent connection.

4,998,338

METHOD AND ARRANGEMENT FOR MANUFACTURING HOT-ROLLED STEEL STRIP

Jürgen Seidel, Kreuztal, and Wolfgang Rohde, Dormagen, both of Fed. Rep. of Germany, assignors to SMS Schloemann-Siemag Aktiengesellschaft, Dusseldorf, Fed. Rep. of Germany

Filed Nov. 6, 1989, Ser. No. 432,050

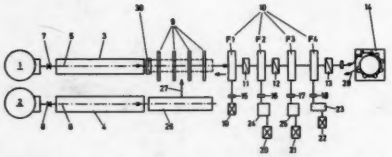
Claims priority, application Fed. Rep. of Germany, Nov. 5, 1988, 3837642

Int. Cl.[5] B21B *1/96, 15/00*

U.S. Cl. 29—527.6 **9 Claims**

1. In a method for manufacturing hot-rolled steel strip from

continuously cast initial material having a thickness of more than 50 mm in continuously successive work steps, including cutting the continuously cast initial material after solidifying into billets having a certain length, heating the billets in a soaking furnace to rolling temperature and introducing the billets to a finishing rolling mill train for rolling the billets into the desired size, wherein the improvement comprises introducing each billet after being heated into a finishing rolling mill train having a plurality of reversible rolling mill stands ar-



ranged one behind the other, rolling each billet in the finishing rolling mill train in a forward movement with a direct sequence of several rolling passes with relatively high moment and low rolling speed and in a reversing movement with a direct sequence of several rolling passes with relatively low moment and high rolling speed, and adjusting a ratio of rate of rotation between drive motors and work rolls of the rolling mill stands between the forward movement and the reversing movement by changing gear transmission of the rolling mill stands.

4,998,339

PROCESS FOR FABRICATION OF AN IRON MEMBER WITH A WINDING FOR GENERATION OF ELECTROMAGNETIC FIELDS

Ernst Wiesner, Dornbirn, Austria, assignor to Zumtobel Aktiengesellschaft, Dornbirn, Austria

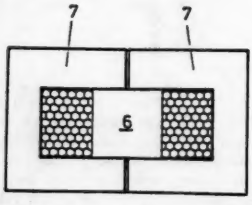
PCT No. PCT/EP89/00064, § 371 Date Sep. 14, 1989, § 102(e) Date Sep. 14, 1989, PCT Pub. No. WO89/07325, PCT Pub. Date Aug. 10, 1989

PCT Filed Jan. 23, 1989, Ser. No. 416,314

Claims priority, application Austria, Jan. 27, 1988, 165/88

Int. Cl.[5] H01F *41/04*

U.S. Cl. 29—606 **4 Claims**



1. Method for fabrication of an iron member with a winding for generation of electromagnetic fields, with the iron member comprising an essentially square-shaped iron core and U-shaped iron yokes arranged in pairs receiving a segment of the winding, the iron yokes having legs, the method including inserting the iron core between the legs, preparing the winding of a plurality of turns from an electrically insulated wire of essentially circular cross-section located next to each other or over each other and subsequently applying a force to the winding or segment thereof transversely to the longitudinal extent of the wires forming the winding, the force applied being such that the wires are plastically deformed and a cross-section through such a turn segment presents itself as a honeycomb-like pattern, the improvement comprising inserting the iron core into the winding comprising undeformed wires, and subsequently sliding the U-shaped iron yokes on and connecting the yokes with the core, wherein core and yokes are displaced against each other to such an extent that the cross-sectional area of the groove or the winding space bounded by the core and the yokes becomes smaller than the cross-sectional area of the undeformed segment of the winding received by the groove or the winding space of the iron member formed by the core and yokes, and wherein core and yokes are pressed against each other with a force which causes the originally circular cross-sections of the wires forming the winding to be permanently deformed and honeycomb-like shaped across the length of the groove or the winding space receiving them.

4,998,340

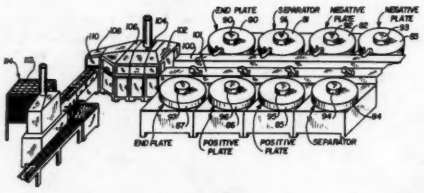
METHOD FOR THE MANUFACTURE OF LEAD-ACID BATTERIES AND AN ASSOCIATED APPARATUS AND ASSOCIATED LEAD-ACID BATTERY

Ellis G. Wheadon, Bernville, and Larry L. Forrer, Reading, both of Pa., assignors to Cal-Tec International, Inc., Temple, Pa.

Division of Ser. No. 315,722, Feb. 24, 1989. This application Jun. 8, 1990, Ser. No. 534,864

Int. Cl.[5] H01M *10/14*

U.S. Cl. 29—623.1 **24 Claims**



1. A process for producing a battery element having at least one positive battery plate, at least one negative battery plate, and at least one interposed separator for a lead-acid battery, comprising the steps of

providing an elementizer means,

feeding predetermined lengths of material from coils of positive battery plate stock, negative battery plate stock, and separator stock to said elementizer means with said separator stock being interposed between adjacent stocks of negative battery plate and positive battery plate,

indexing said materials to establish adjacent coextensive portions of said materials, and

cutting said portions of said materials to establish said battery element having individual negative and positive battery plates with interposed separators.

4,998,341

METHOD FOR MAKING MINERAL INSULATED METAL SHEATHED CABLES

Trevor D. Jones, White Cross, England, assignor to Inco Alloys Limited, Hereford, England

Filed Apr. 2, 1990, Ser. No. 503,314

Claims priority, application European Pat. Off., Apr. 18, 1989, 89303821-6

Int. Cl.[5] H01B *13/20*

U.S. Cl. 29—828 **6 Claims**

1. A method for producing mineral insulated metal sheathed cable, the cable including an external sheath in the form of a tube, at least one conducting member and an insulator disposed within the tube, the method characterized by:

a. introducing at least one conducting rod and the insulator into a tubular sheath, the conducting rod and tubular sheath having diameters substantially larger than the diameter of the corresponding finished conducting member and cable;

b. sealing the tubular sheath;

c. hot working the sealed tubular sheath to a tube of a first predetermined diameter;

d. reducing the tube on a pilger mill to a second predetermined diameter; and

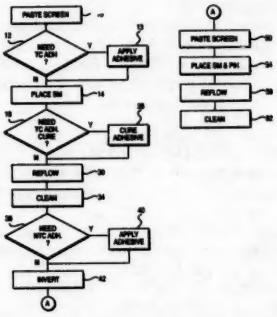
e. working the tube to a final predetermined cable diameter.

4,998,342

METHOD OF ATTACHING ELECTRONIC COMPONENTS

Ralph E. Bonnell, Austin; George C. Castello, Round Rock, and Karl G. Hoebener, Georgetown, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 31, 1989, Ser. No. 401,359
Int. Cl.[5] H05K *3/34*
U.S. Cl. 29—840 **10 Claims**



1. A process for populating both sides of a printed circuit board comprising the sequential steps of:

(a) screening solder onto surface mount lands on a first side of the printed circuit board;

(b) placing surface mount components on said lands on said first side;

(c) reflowing solder applied in step (a);

(d) screening solder on surface mount lands and into plated through-holes on a second side of said printed circuit board;

(e) placing surface mount and pin in hole components on said second side; and

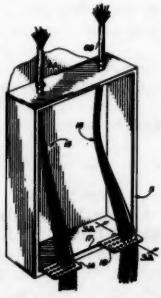
(f) reflowing all solder on said printed circuit board.

4,998,343

ELECTRICAL WIRING METHOD AND APPARATUS

Clifford T. Costello, 4959 San Molina, Sierra Vista, Ariz. 85635

Filed Dec. 12, 1989, Ser. No. 448,876
Int. Cl.[5] H01R *43/00*; B23P *19/00*
U.S. Cl. 29—857 **11 Claims**



1. A method of routing and connecting a first group of number-coded electrical conductors to an electrical power distribution panel in a housing, the method comprising the steps of:

(a) pulling at least one of a plurality of the number-coded conductors of the first group through a first conduit into an interior of a distribution panel housing;

(b) holding a reusable first terminal jig having a plurality of numbered-coded holes therethrough in generally fixed relationship to the distribution panel housing;

(c) inserting free ends of the conductor or conductors through correspondingly numbered holes in the first terminal jig;

(d) repeating steps (a) through (c) for additional conductors of the first step until all of the conductors of the first group have been pulled through the first conduit into the interior of the distribution panel housing and inserted through corresponding number-coded holes in the first terminal jig;

(e) installing the electrical power distribution panel in the distribution panel housing, the electrical power distribution panel including a number of circuit breakers having a plurality of terminals number-coded correspondingly to the

(f) withdrawing the conductors from the first terminal jig and electrically connecting them to correspondingly number-coded terminals of the circuit breakers;

(g) removing the first terminal jig from the vicinity of the electrical power distribution panel and the housing.

4. A reusable wire routing tool for aiding the routing of conductors into a distribution panel housing and connecting the conductors to corresponding circuit breaker terminals of an electrical distribution panel therein, comprising in combination:

(a) a plate having an upper surface;

(b) an array of number-coded holes extending through the plate;

(c) a plurality of number-code indicia on the upper surface adjacent to the holes, respectively, the holes each having a diameter greater than an outside diameter of the conductors;

(d) means for attaching the first plate in a generally fixed relationship to the distribution panel housing and detaching the first plate from the generally fixed relationship to the distribution panel housing.

4,998,344

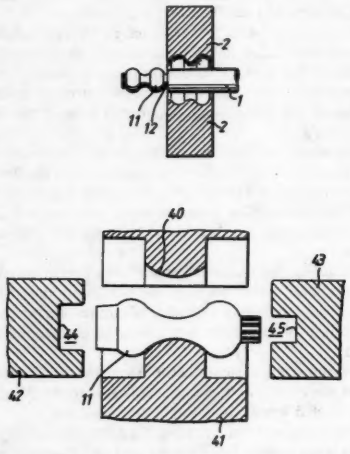
METHOD OF MANUFACTURING A HUB

Kin Ho Hsieh, No. 125, Shih Chien St., Feng Yuan City, Taiwan

Filed Mar. 27, 1990, Ser. No. 499,793
Int. Cl.[5] B21K *1/40*
U.S. Cl. 29—894.362 **1 Claim**

1. A method of manufacturing a hub comprising: rotary swaging a workpiece which is substantially a cylindrical tube in order to form several semi-products thereon, said workpiece being swaged by at least three dies from an outer peripheral surface thereof, said dies striking or hammering said workpiece in a pulsating hammer-type action so that said semi-products are formed smoothly and homogeneously, and two bearing cup seats are formed on both ends of said semi-product; cutting said semi-products on said workpiece into each semi-product; squeezing both ends of each said semi-product, a center portion of said semi-product being stationarily embraced by an upper mold and a lower mold, both ends of said semi-product

being reachable by a right mold and a left mold, and said both ends of said semi-product being squeezed by said right mold



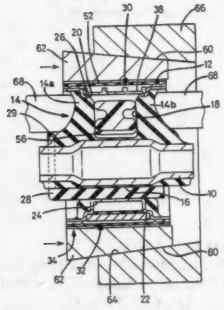
and said left mold when said right mold and said left mold move toward said upper mold and said lower mold.

4,998,345

METHOD OF MANUFACTURING FLUID-FILLED ELASTIC MOUNT HAVING PRESSURE-RECEIVING AND EQUILIBRIUM CHAMBERS

Yoshiki Funahashi, Iwakura; Nobuo Matsumoto, Nagoya, and Keita Shiraki, Kasugai, all of Japan, assignors to Tokai Rubber Industries, Ltd., Japan

Filed Jun. 26, 1990, Ser. No. 543,435
Int. Cl.[5] B23P *21/00*
U.S. Cl. 29—897.2 **8 Claims**



1. A method of manufacturing a fluid-filled elastic mount which includes an elastic body flexibly connecting an inner and an outer sleeve which are radially spaced apart from each other, means for defining a pressure-receiving chamber and a variable-volume equilibrium chamber which are formed between the inner and outer sleeves and which are filled with a non-compressible fluid, and means for defining an orifice for fluid connection between the pressure-receiving and equilibrium chambers, said equilibrium chamber being at least partially defined by a flexible diaphragm, comprising the steps of:

preparing an inner unit including said inner sleeve and an intermediate sleeve disposed radially outwardly of the inner sleeve, such that said inner and intermediate sleeves are flexibly connected to each other by said elastic body formed therebetween, and such that a pocket is formed in said elastic body such that said pocket is open on an outer circumferential surface of said inner unit through said intermediate sleeve and such that an axial dimension of said pocket in an axial direction of the elastic mount is defined by opposite side walls of the elastic body which are opposed to each other in said axial direction;

placing said inner unit within a mass of said non-compressible fluid, and press-fitting said outer sleeve on said inner unit so as to fill said pocket with said fluid and fluid-tightly close said pocket for thereby providing said pressure-receiving chamber, while applying an axial force to at least one of said opposite side walls of said elastic body in said axial direction, to thereby cause elastic deformation of said at least one side wall so as to expand into said pocket; and

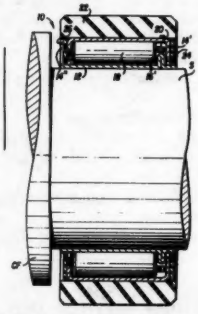
removing said axial force from said at least one side wall, to permit said at least one side wall to elastically deform so as to increase a volume of said pressure-receiving chamber, thereby reducing a volume of said equilibrium chamber.

4,998,346

METHOD OF MAKING A UNITARY, AXIALLY SELF-LOCATING NEEDLE BEARING

Mark B. Behrens, Charlotte, N.C., assignor to INA Bearing Company, Fort Mill, S.C.

Division of Ser. No. 336,790, Apr. 12, 1989, Pat. No. 4,955,732.
This application Mar. 26, 1990, Ser. No. 499,069
Int. Cl.[5] B21D *53/12*
U.S. Cl. 29—898.61 **2 Claims**



1. A method of making a drawn shell, axially located needle bearing comprising:

deep drawing an outer race;

deep drawing an inner race;

providing a plurality of needle rollers;

crimping a portion of one of said races to provide a radially projecting annular flange thereon;

providing a radially projecting annular flange on the other one of said races;

assembling said outer race, said inner race and said needle rollers with said annular flange on the other one of said races and adjacent ends of said needle rollers, whereby said inner and outer races are axially located with respect to one another.

4,998,347

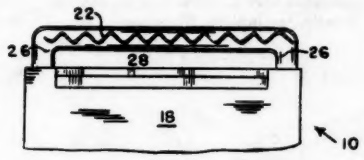
SHAVING INSTRUMENT WITH HIGH ENERGY BEAM INDUCED MICROSTRETCH ELEMENT

Friedrich Schächter, Draschestrasse 31, Vienna, Austria

Filed May 8, 1989, Ser. No. 348,630
Int. Cl.[5] B26B *19/42*
U.S. Cl. 30—34.2 **31 Claims**

19. In a shaving instrument comprising a handle, a razor

blade having an edge and attached to the end of the handle, and a guard bar arranged in precise spaced relation parallel to said razor blade edge, the improvement which comprises producing a patterned texture upon an outer surface of said guard



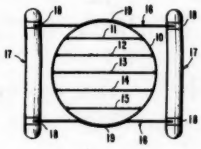
bar with a high energy beam wherein said texture includes one or more depressions each having a mound of minute height which constitutes a border of each depression and each said one or more depressions follow the configuration of a meander.

4,998,348

TODDLER MEAL PROCESSOR

Richard A. Foate, 4514 Hanover Ave., Richmond, Va. 23221

Filed May 11, 1990, Ser. No. 522,132
Int. Cl.[5] A21C *5/08;* **B26B** *3/00, 3/04*
U.S. Cl. 30—114 **17 Claims**



1. A food processing implement for cutting food such as sandwiches into smaller pieces for easier biting by children comprising:

a circular frame of a diameter slightly larger than that necessary to encircle the standard sandwich having a height approximately equal to or higher than the food to be cut with said frame having a bottom edge lying in a horizontal plane;

a plurality of straight cutting blades parallel to one another and approximately equally spaced apart and attached at their ends to said circular frame with the height of said cutting blades approximately the height of said frame and the cutting edge of said blades lying in a horizontal plane slightly below or even with the plane of the bottom edge of said frame;

a plurality of handle support members mounted on the side of said circular frame and extending upward and outward therefrom and each handle support member having an outer end; and

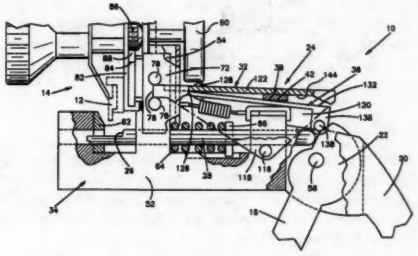
two handles above and outboard of said circular frame on opposite sides thereof attached to said handle support members outer end whereby both handles may be pressed vertically downward at the same time to cause said cutting blades to cut the food into strips of approximately the same blades to cut the food into strips of approximately the same width.

4,998,349

KEY-CUTTING DEVICE

Gregory J. Killeen, Mentor, Ohio, assignor to Curtis Industries, Inc., Eastlake, Ohio

Filed Aug. 28, 1989, Ser. No. 399,630
Int. Cl.[5] B26D *5/10;* **B26F** *1/12*
U.S. Cl. 30—131 **26 Claims**



5. A key-cutting device for use in cutting one or more notches in a key blank, said key-cutting device comprising a base, holder means for holding a key blank in which one or more notches are to be cut, said holder means being movable relative to said base between initial and cutting positions, cutter means movable relative to said base to cut one or more notches in a key blank held by said holder means when said holder means is in a cutting position, and actuator means connected with said base for moving said holder means from the initial position to a cutting position, said actuator means including a movable force transmitting member, a leaf spring connected with said force transmitting member, a body of polymeric material disposed between said leaf spring and said force transmitting member, said body of polymeric material having an extent transverse to a longitudinal central axis of said leaf spring which is at least substantially as great as the extent of said leaf spring in a direction transverse to the longitudinal central axis of said leaf spring and parallel to a major side surface of said leaf spring, and means for applying force to said leaf spring to move said holder means from the initial position to a cutting position by moving said force transmitting member and leaf spring relative to said base and to deflect said leaf spring relative to said force transmitting member about a fulcrum which is at least partially formed by said body of polymeric material upon continued operation of said actuator means after said holder means has moved from the initial position to the cutting position, said body of polymeric material being resiliently compressed by said leaf spring upon operation of said actuator means and having an area of engagement with said leaf spring which increases during operation of said actuator means and compression of said body of polymeric material.

4,998,350

KNIFE AND SHEATH

Lynn C. Thompson, 987 Sand Piper Ct., Ventura, Calif. 93001

Filed Dec. 5, 1989, Ser. No. 446,120
Int. Cl.[5] B26B *29/02*
U.S. Cl. 30—151 **5 Claims**

1. A knife and sheath combination comprising:

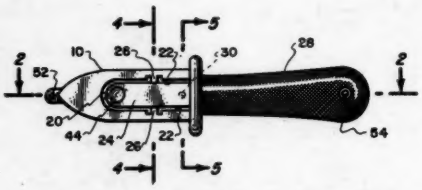
a knife with a hole through the blade in a position proximate the handle;

a knife blade surrounding sheath means having a pocket adapted to receive the knife blade therein comprising a plastic structure with a back side adapted to fit adjacent one side of the knife blade and a front side adapted to fit adjacent the opposite side of the blade, said pocket being formed between said front and back sides;

lever means disposed in said sheath means and connected to said sheath means by hinge means located generally in the central portion of the lever means, said lever means positioned in the plane of the front side and connected to said

front side by said hinge means, and said lever means including a guide recess in said remote end of said lever means; and

engaging pin means on said lever means adapted to engage



said hole in said knife when said knife is inserted into said pocket, said pin means being retractable from said hole by the compression of the lever means at the nd of the lever remote from said pin means so as to pivot the lever means about said hinge means.

4,998,351

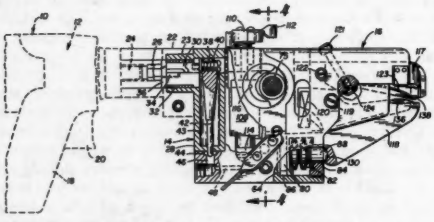
POWER DRIVEN HAND TOOL ASSEMBLY

Ruben J. Hartmeister, 1034 6th St., Golden, Colo. 80403

Filed Jun. 14, 1989, Ser. No. 366,776

Int. Cl.[5] B26B *15/00*

U.S. Cl. 30—228 **15 Claims**



1. A power driven hand tool assembly, comprising:

a motor means for providing rotational motion;

a reservoir containing fluid and having an internal pressure source urging said fluid to move out of the reservoir, wherein said internal pressure source comprises a piston contained in the reservoir and moveable in a first direction toward the fluid, and a spring urging said piston to move in said first direction;

a power cylinder containing a power piston that is moveable in first and second directions within the cylinder;

a pump means having fluid contained therein, joined to said motor means for receiving the rotational motion therefrom and in response thereto imparting a condition of alternating relatively increased and decreased pressure to said fluid contained in the pump means; and

valve means in communication with the fluid contained in the pump means for discharging a portion thereof in substantially one directional flow to said power cylinder on a first side of said power piston in response to said relative fluid pressure increase, and thereby moving the power piston in the first direction within the power cylinder, and said valve means in communication with the reservoir for receiving fluid under pressure therefrom in substantially one directional flow in response to said relative pressure decrease in the fluid contained in the pump means.

4,998,352

CUTTING UNIT FOR A SHAVING APPARATUS

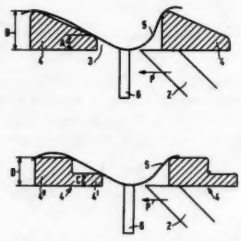
Eduard W. Tietjens, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

Continuation of Ser. No. 147,848, Jan. 25, 1988, abandoned. This application May 22, 1989, Ser. No. 356,633

Claims priority, application Netherlands, Jan. 27, 1987, 8700187

Int. Cl.[5] B26B *19/14*

U.S. Cl. 30—346.51 **5 Claims**



1. A cutting unit for a shaving apparatus, which cutting unit comprises a cutting head with hair entrance apertures and a drivable cutting member the hair entrance apertures being separated by dams extending substantially transversely to a direction of driving (P) of the drivable cutting member and having a first end and a second end, wherein in cross-section a dam has an asymmetrical profile with a thickness which increases stepwise in the direction of driving (P) from said first end to the second end of said dam.

4,998,353

RECIPROCATING TOOL

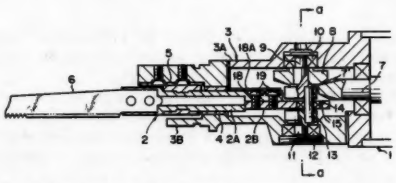
Kenji Fukuda, and Yasuo Kazama, both of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Tokyo, Japan

Filed May 18, 1989, Ser. No. 353,547

Claims priority, application Japan, May 23, 1988, 63-67919[U]

Int. Cl.[5] B23D *49/00, 49/04, 49/10*

U.S. Cl. 30—392 **5 Claims**



1. A reciprocating tool, comprising:

(a) a drive source; and

(b) a tool holder for holding a grinding/cutting tool capable of reciprocation; wherein

(c) said reciprocation drive source includes:

a driving shaft;

a driving bevel gear mounted on the driving shaft;

a first shaft extending at right angles to the direction of reciprocal movement of the grinding/cutting tool;

a second shaft opposingly facing the first shaft;

said first and second shafts being coaxially mounted relative to one another for rotational motion about a primary axis;

a third shaft connecting the first and second shafts and establishing an eccentric axis that is eccentrically disposed relative to said primary axis of said first and second shafts;

a bearing mounted on said third shaft;

a reciprocating member coupled to the tool holder, said

reciprocating member having a slot extending at right angles to the reciprocal movement direction of the grinding/cutting tool so as to engage the bearing; and

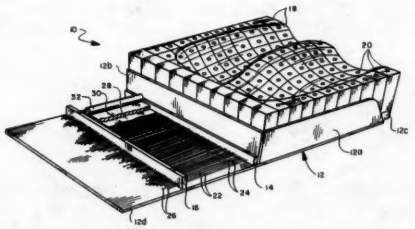
a pair of cylindrical guide members provided adjacent to the reciprocating member, said guide members being movably mounted and defining guide grooves, wherein a rear end portion of said reciprocating member includes a pair of side edge portions that extend essentially parallel to the reciprocal movement direction of said reciprocating member, and wherein each of said side edge portions is engaged within, and held by, a respective one of said defined grooves of said guide members.

4,998,354

MECHANICAL SHAPE SENSOR

Michael W. Silverman, Highland Park; Michael Heinrich, Chicago, both of Ill.; Clifford E. Brubaker, Charlottesville, and Colin A. McLaurin, Crozet, both of Va., assignors to Pin Dot Products, Niles, Ill.

Filed Jun. 20, 1990, Ser. No. 540,842
Int. Cl.[5] G01B *5/20*
U.S. Cl. 33—514.2 **24 Claims**



1. Apparatus for measuring and recording the contour of a person's seating support surface, said apparatus comprising:

a plurality of compressible, resilient elements disposed in a generally planar array and adapted to receive a person seated thereon, wherein upper portions of said elements are deflected in accordance with the person's seating support surface;

a plurality of flexible, non-compressible members each having a first end coupled to an upper portion of a respective one of said elements;

guide means coupled to each of said members for aligning second end portions of each of said members in a planar array;

indicator means coupled to a each of said members and moveable with its associated member as the member is displaced upon compression of an element with a person positioned thereon; and

recording means for engaging said indicator means and recording the relative positions of said indicator means in a two-dimensional format.

4,998,355

APPARATUS AND METHOD FOR POSITIONING OPPOSING MARKS ON OPPOSING SURFACES

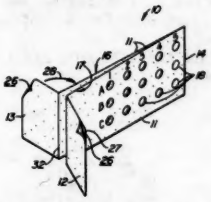
Teddy R. Greene, 2171 Research Dr., Livermore, Calif. 94550

Filed Feb. 2, 1990, Ser. No. 474,600
Int. Cl.[5] B25H *7/00;* **G01B** *3/14*
U.S. Cl. 33—667 **2 Claims**

1. A device for positioning opposed marks on opposing surfaces comprising:

a flexible, foldable, flat sheet having a centrally disposed fold therein, whereby a first half of said sheet is foldable back upon a second half of said sheet;

a first pattern of holes defined in said first half of said sheet, and a matching pattern of holes defined in said second half of said sheet, said matching pattern being formed and arranged in said sheet so as to lie in registration with said first pattern when said second half is folded back upon said first half, whereby marks positioned on said opposing surfaces through corresponding holes in said first and matching patterns will oppose one another;



indicia on said first half for labeling the holes of said first pattern and corresponding indicia on said second half for labeling corresponding holes of said matching pattern; and

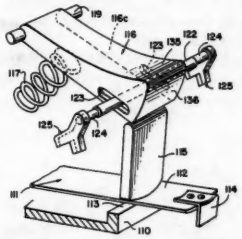
means for removably securing opposed end portions of said sheet to said surfaces.

4,998,356

CARPENTER'S TAPE MEASURE WITH PUSH ON-PUSH OFF LOCKING MECHANISM

David S. Chapin, 902 W. Johnson St., Raleigh, N.C. 27605

Filed Oct. 31, 1989, Ser. No. 429,487
Int. Cl.[5] G01B *3/10*
U.S. Cl. 33—767 **12 Claims**



1. A tape measure comprising:

a housing;

a measuring tape contained within said housing;

a lock shoe mounted within said housing such that said lock shoe can contact said measuring tape so as to press said measuring tape against a portion of said housing; and

a push on-push off locking mechanism mounted within said housing and in communication with said lock shoe, such that when said locking mechanism is pushed on said lock shoe presses said measuring tape against said housing and when said locking mechanism is pushed off contact between said measuring tape and said housing tape is released;

wherein said locking mechanism comprises a button rotatably mounted within said housing and adapted for pressing said lock shoe against said housing; and

wherein said button rotates in the same direction when said locking mechanism is both pushed on and pushed off.

4,998,357

BINOCULAR TELESCOPR WITH RADIALLY ACTING COMPENSATING SPRING

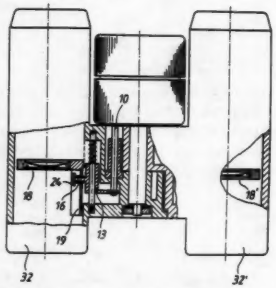
H. Peter Farnung, Bad Nauheim; Alfred Hengst, Lahnau, and Heinz Keiner, Solms, all of Fed. Rep. of Germany, assignors to Leica GmbH, Solms, Fed. Rep. of Germany

Filed Dec. 22, 1989, Ser. No. 455,143

Claims priority, application Fed. Rep. of Germany, Dec. 12, 1988, 8815913[U]

Int. Cl.[5] G02B *7/06, 23/00*

U.S. Cl. 350—556 5 Claims



1. A binocular telescope having at least one barrel and a focusing means for focusing a lens arrangement in the barrel, said focusing means comprising:

a guide rod;

a support axially displaceable along said guide rod;

a transmission bar movable via a control knob for moving said support;

a driving pin arranged on a support and engaged with a focusing member located in said barrel; and

a compensating spring means for interacting with the driving pin which acts radially upon the focusing member.

4,998,358

SIZE-ADJUSTABLE SKI BOOT

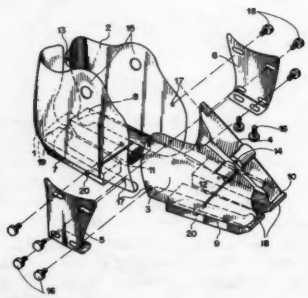
Helmut Girardelli, Oberegg, Switzerland, assignor to Aluxa AG, Liechtenstein, Liechtenstein

Filed Aug. 17, 1989, Ser. No. 395,084

Claims priority, application Switzerland, Aug. 22, 1988, 3114/88

Int. Cl.[5] A43B *5/04, 5/16*

U.S. Cl. 36—117 14 Claims



1. A size-adjustable ski boot of the type comprising an outer boot and an inner boot, said outer boot including a shell, an upper heel shell, a sole, and a fastening means, wherein the improvement comprises:

a said shell divided by first and second planes into four shell parts separated from each other at said planes, said planes being normal to the plane of said sole, said first plane being normal to the axis of said sole and said second plane running parallel to said axis;

a said sole divided in the same way as said shell; and

adjusting means holding said shell parts and sole parts together in such a way as to enable longitudinal and transverse adjustment of said ski boot.

4,998,359

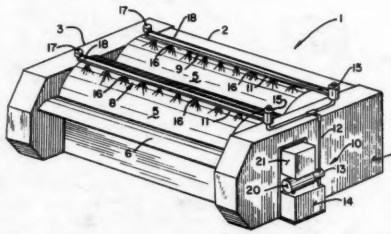
AUTOMATIC WAX LUBRICATOR FOR FLATWORK IRONER

Bill R. Rhymer, St. Louis, Mo., and Luc Rouquart, Ghent, Belgium, assignors to The Rhymer Company, St. Louis, Mo.

Filed Oct. 2, 1989, Ser. No. 415,963

Int. Cl.[5] D06F *63/00, 63/02, 87/00;* B05B *12/00*

U.S. Cl. 38—14 4 Claims



1. In a flatwork ironer of the type used for ironing flat cloth items, and wherein the ironer includes at least one chest and rotating roll and having associated therewith a sprayer for deposition of lubricating wax upon the rotating roll and thence to the chest to facilitate the ironing process, the improvement comprising, a housing for the ironer for supporting each of said at least one roll during usage, a spray means spanning a width of each roll and spaced therefrom at an upward position to periodically spray said lubricating wax thereon, said spray means including a spray conduit, a series of spray nozzles spacedly arranged upon said conduit for accommodating wax spray, a pump, a motor operatively associated with said pump for said conveying wax under pressure through said conduit, a solenoid valve associated with said conduit and when actuated, opening to provide for the flow under pressure of said wax to and through the conduit and to discharge said wax from the spray nozzle and onto a respective proximate roll, timer means operatively associated with said motor, and solenoid valve to initiate an actuation of said motor, and subsequently the opening of said valve to provide spraying of said wax onto the proximate roll for the time needed, said timer means incorporating a time delay therein to allow the ironer to pass any remaining cloth item through the ironer before the solenoid valve opens to pass said wax under pressure through the spray means for deposition onto the proximate roll, a wax reservoir for holding a supply of said lubricating wax, a return line communicating with said conduit for returning unsprayed wax to the reservoir, and said wax being a fluidic polyolefin capable of being pumped under pressure from the reservoir for periodic deposition by spraying onto the proximate roll during usage of the ironer.

4,998,360

PORTABLE IRONING PRESS INCLUDING CHAIN, GEAR, AND SPRING ARRANGEMENT, FOR PRESSING ARTICLES

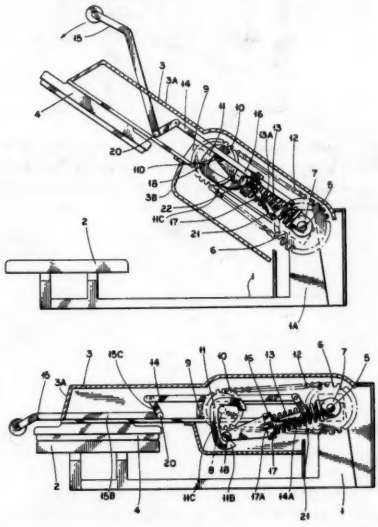
Hee K. Lee, Seoul, Rep. of Korea, assignor to Brother International Corporation, Somerset, N.J.

Filed Mar. 5, 1990, Ser. No. 488,657

Claims priority, application Rep. of Korea, Jan. 16, 1990, 1990-426

Int. Cl.[5] D06F *71/10, 71/36, 71/00*

U.S. Cl. 38—36 **11 Claims**



1. An ironing press comprising:

a base with a base plate;

an arm with an arm plate, said arm being pivotable between a first position wherein said plates are separated from each other and a second position wherein said plates cooperate to form a pressing zone for ironing garments;

a chain-and-gear arrangement coupled between said arm and said base;

spring means for generating a pressure; and

coupling means for selectively applying said pressure to said plates through said chain-and-gear arrangement when said arm is in said second position.

4,998,361

COMBINATION PICTURE FRAME AND ALBUM INTRODUCTION

Melvin L. Gordon, West Palm Beach, Fla., assignor to Melannco International Ltd., Chelsea, Mass.

Filed Jan. 23, 1989, Ser. No. 299,089

Int. Cl.[5] G09F *1/12*

U.S. Cl. 40—152 **5 Claims**

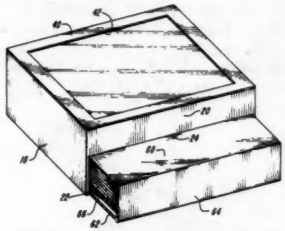
1. A combination picture frame and album comprising

a tray open at a top and including a bottom wall and a plurality of side walls of equal height extending upwardly from the sides of the bottom wall and said side walls having tops,

an opening in one of the side walls adjacent the bottom wall providing access to the interior of the tray through other than the open top,

a support disposed in the tray having legs which rest on the bottom wall and a platform parallel to the bottom wall adjacent the tops of the and said platform having edges, said platform being suitable for supporting a picture to be displayed in the picture frame,

a frame member having a panel with a window therein through which a picture on the platform may be viewed, said frame member having side walls which fit between



the edges of the platform and the side walls of the tray for retaining the panel closely adjacent the platform,

and an album for holding a plurality of pictures slidable in and out of the tray through the opening without disturbing the support and frame member.

4,998,362

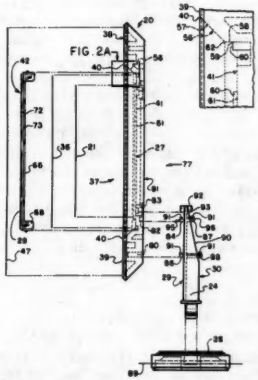
PICTURE FRAME ASSEMBLY

Brian S. Stewart, San Francisco; James E. Sacherman, and John W. Toor, both of Palo Alto, all of Calif., assignors to Acme Frame Products, Inc., Chicago, Ill.

Filed Dec. 22, 1988, Ser. No. 289,590

Int. Cl.[5] A47G *1/06;* G09F *1/12*

U.S. Cl. 40—152.1 **12 Claims**



1. A picture frame assembly for displaying a two dimensional work of art, comprising:

a frame adapted to have the artwork mounted thereon, said frame having a front side and a rear side, said rear side including a pair of channels,

a base, and

an upright support interconnecting said frame with said base, said upright support having a front side with a first geometric profile and a back side with a second geometric profile, said front side having first connecting means for selectively connecting the front side of said support to the rear side of said frame, said back side including second connecting means for selectively connecting the back side of said support to the rear side of said frame,

said first and second connecting means each comprising a pair of protruding ledges which are adapted to be received within and engage said channels of said frame, and

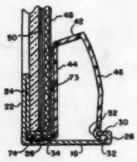
said first and second connecting means each including a protruding tab.

4,998,363

PICTURE/POSTER FRAME ASSEMBLY AND RETAINER FOR HOLDING COMPONENTS IN THE FRAME OF THE ASSEMBLY

Daniel E. Vilims, Downers Grove, Ill., assignor to Chuen J. Rhee, Crystal Lake, Ill.

Filed Jun. 21, 1989, Ser. No. 357,769
Int. Cl.[5] A47G *1/06*
U.S. Cl. 40—156 **17 Claims**



1. A picture frame assembly including a picture frame and backing panel having a back surface mounted therein which picture frame has, in cross-section, a side wall, a turned in short flange at the rear end of the side wall extending forwardly to a free end, a rearwardly extending flange at the front end of the side wall providing a forward locator slot between the rearwardly extending flange and the side wall, said frame assembly including two or more retainer members, each retainer member including a generally U or V shaped retainer clip having an inner linear-planar leg portion having an outer areal surface adapted to abut and be adjacent to a portion of the back surface of said backing panel, and having a flange extending laterally outwardly therefrom, a bight portion extending from said inner leg portion at an angle thereto, and an outer leg portion which extends in a non-linear, non-planar manner to an outer end hook formation, and means for grippingly engaging said outer areal surface of said inner leg portion of said retainer clip to said back surface of said backing panel, said laterally extending flange of said clip member being received in said locator slot and said hook formation having a groove which is adapted to receive the free end of said short flange extending forwardly from said side wall toward the picture in said picture, and said outer areal surface being of sufficient areal extent of at least approximately 0.25 inches in width and 1 inch in length to provide support to said picture frame to inhibit distortion thereof while at the same time providing a retaining force to said backing panel.

4,998,364

VISUAL DISPLAY AND AMUSEMENT DEVICE

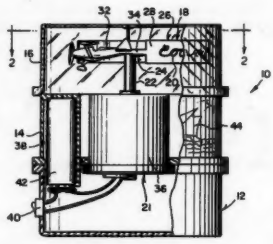
David Sengstaken, 1 The Rise, Woodbury, N.Y. 11797

Filed Jan. 30, 1989, Ser. No. 302,785
Int. Cl.[5] G09F *19/08*
U.S. Cl. 40—411 **7 Claims**

1. A visual display and amusement device, comprising:

(a) a housing having a cylindrically-shaped lower portion and a cylindrically-shaped upper transparent portion, said cylindrically-shaped upper transparent portion being mounted on top of said cylindrically-shaped lower portion;

(b) means located in said upper transparent portion of said housing for holding a message, said holding means include a rotatable vertical shaft having a horizontal arm connected to and extending away from an upper end of said rotatable vertical shaft, said horizontal arm is directly connected at one end to a curved banner that has the message affixed transversely thereon, said curved banner is rigid and is directly mounted to a miniature airplane model without the use of ropes and illumination, said airplane model and said curved banner being connected so that when said vertical shaft rotates it will give an illusion that said airplane model is pulling said banner in a constant sized circular movement about said upper transparent portion of said housing; and a rotating means located in



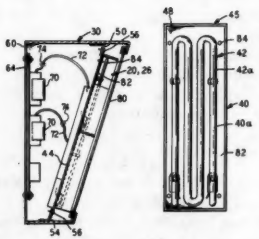
said lower portion of said housing including a motor which is coupled to said rotatable vertical shaft for rotation of said holding means to convey the message on said curved banner.

4,998,365

SEGMENTED NEON DISPLAY

Donald J. Bezek, LaGrange, Ill., assignor to Kazor Systems Inc., LaGrande, Ill.

Filed Oct. 13, 1989, Ser. No. 421,089
Int. Cl.[5] G09F *13/26*
U.S. Cl. 40—545 **25 Claims**



1. A neon sign comprising:

at least one module, said module comprising a panel having mounted thereon a plurality of serpentine neon tube segments arranged in a pattern, said neon tube segments selectively electrically charged for displaying an alpha-numeric character, and means for energizing each segment arranged in said pattern to alternately form a portion of at least two alpha-numeric characters;

a plurality of power source connections for individually providing electric power to charge selected ones of said neon tube segments; and

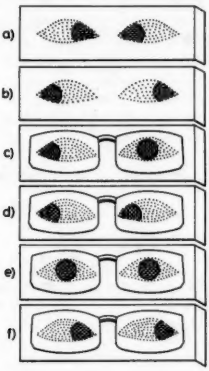
a housing, carrying said power source connections and having means for removably mounting said panel to said housing.

4,998,366

MECHANISM FOR DRIVING A PLURALITY OF OBJECTS ALONG RELATIVE RECIPROCATING PATHS ALTERNATINGLY IN THE SAME DIRECTION AND IN AN OPPOSITE DIRECTION

Michel J. Richaud, 226 rue de Vaugirard, 75015 Paris, France

Filed Mar. 31, 1988, Ser. No. 175,841
Claims priority, application France, Aug. 5, 1986, 86 11302
Int. Cl.[5] G09F *13/00*
U.S. Cl. 40—547 **12 Claims**



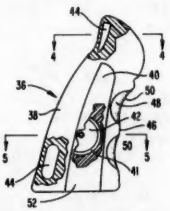
1. Motion transmission apparatus for driving a plurality of objects along relative paths alternately in the same and in opposite directions and comprising a plurality of gear wheels, drive means for rotating said gear wheels and imparting intermittent rotary motion to at least one of said gear wheels and including a plurality of drive members equal in number to said gear wheels and constrained for movement in unison, each of said drive members having a plurality of teeth thereon for intermeshing engagement with teeth on an associated one of said gear wheels, at least one of said drive wheels having a toothless zone intermediate the teeth thereon, a plurality of connecting rods having first and second ends, each of said connecting rods having its first end pivotally connected to an associated one of said gear wheels in eccentric relation to the axis thereof, and means for carrying objects to be driven and including a plurality of rocker arms and means supporting each of said rocker arms for pivotal movement about an associated rocker axis, each of said rocker arms being pivotally connected in spaced relation to its rocker axis to the second end of an associated one of said connected rods.

4,998,367

COMPOUND GRIP FOR HANDGUNS

Joel Leibowitz, 26 W87th St., New York, N.Y. 10024

Filed Jan. 12, 1990, Ser. No. 465,332
Int. Cl.[5] F41C *23/06, 23/10*
U.S. Cl. 42—71.02 **22 Claims**



1. A compound grip for handguns for attachment to the rear frame portion of the handgun and adjacent to the trigger guard of the handgun comprising, in combination:

an elastomeric base coextensive with right and left sides of said rear frame portion and extending rearward thereof;

a pair of mirror-imaged palmpiece inserts attached to and extending into said elastomeric base with one of said pair of palmpiece inserts on the right outer portion of the compound grip and the other on the left outer portion, said palmpiece inserts each, in turn, further comprising:

a gel sac embedded within the central inner portion thereof for delaying the after shock forces upon firing of the handgun; and,

at least two elastomeric finger rests attached to the compound grip in the area below the trigger guard of the handgun;

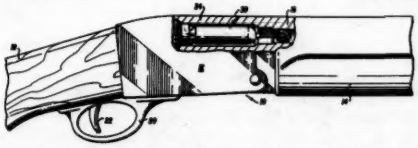
whereby, upon firing of the handgun, said gel sac delays the after shock forces, the elastomeric finger rests aid re-alignment of the handgun, and the palmpiece inserts retain adequate grip.

4,998,368

FIREARM CLEANING DEVICE AND METHOD

Richard A. Blase, Rte. 2, Box 103, Asheboro, N.C. 27203

Filed Jul. 10, 1989, Ser. No. 377,060
The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.
Int. Cl.[5] F41A *29/00, 29/04*
U.S. Cl. 42—95 **13 Claims**



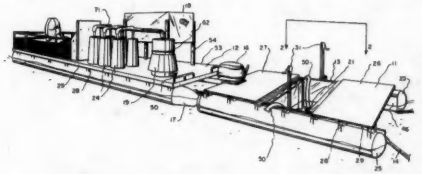
1. A device for cleaning the bore of a firearm having a firing pin and a shell chamber, said device comprising a compressed gas cartridge of a size sufficient to be received in said chamber of said firearm, said cartridge having a first end adapted to be positioned toward the bore of the firearm and a second end adapted to be positioned toward the firing pin of the firearm, means for discharging compressed gas only from the second end of the cartridge to flush both the shell chamber and bore of said firearm with the discharged gases from said cartridge and means for recharging said cartridge with compressed gas following said discharge.

4,998,369

BRINE SHRIMP EGG HARVESTER

Mark S. Lamon, P.O. Box 711, Snowville, Utah 84336

Filed Aug. 15, 1989, Ser. No. 394,203
Int. Cl.[5] A01K *81/04*
U.S. Cl. 43—6.5 **23 Claims**



1. A device for harvesting brine shrimp cysts from a body of brine having such cysts in a thin layer at its surface, said device comprising:

a cyst collection vessel having a bottom member and wall member means upstanding therefrom so as to form therewith a sump pit within the bottom of the vessel, wherein a portion of the wall member means has a thin uppermost horizontal edge and is selectively positionable with respect to the remainder of the vessel;

means supporting the collection vessel in the brine with the sump pit portion submerged; so that

the positionable wall portion may be positioned selectively

independently of the remainder of the vessel with its thin edge slightly below the surface of the brine, so that the cyst containing surface layer of the brine may flow over the thin edge into the sump pit without movement of the supporting means within the brine; and

pumping means removing the resulting contents of the pit.

4,998,370

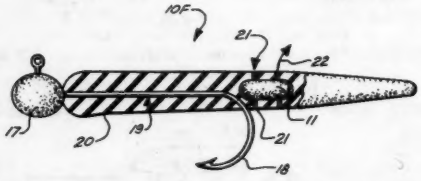
ARTIFICIAL AQUATIC BAIT ARTICLE AND METHOD OF MANUFACTURE

Adrian Lawler, 2364 Davidson Rd.; Peter Schwark, 288 McCool St., both of Ocean Springs, Miss. 39564, and Joe Moore, 3 Legett Cir., Gulfport, Miss. 39503

Filed Jun. 23, 1989, Ser. No. 372,428

Int. Cl.[5] A01K *85/00*

U.S. Cl. 43—42.06 **7 Claims**



1. An aquatic bait article for long term underwater use in attracting crabs, fishes lobster, crayfish, turtles and the like by long term release of fish oil comprising:

(a) an article body having a paraffin base as a carrier and with a melting point of about 110°–160 ° F.;

(b) a fish oil distributed throughout and carried by the article body;

(c) the fish oil formed with the article body by heating the paraffin to a temperature above its melting point and mixing the fish oil with the melted paraffin, allowing the mixture to cool in a desired molded shape.

4,998,371

FISHING LURE

Will Driesel, R.R. #4, Box 41-A, Broken Bow, Okla. 74728

Filed Dec. 18, 1989, Ser. No. 451,569

Int. Cl.[5] A01K *85/00*

U.S. Cl. 43—42.16 **1 Claim**

1. A fishing lure which includes:

a body;

an elongated rigid wire shaft extending centrally through said body and projecting from opposite ends of the body and having a first end and a second end;

an eye on said first end of said wire shaft spaced from said body for attaching a retrieving line to said lure via said eye;

at least one spherical spacer element between said first end of said wire shaft and said body;

a spinner blade assembly connected to a span of said wire shaft between said eye and said spherical spacer element, said spinner blade assembly including:

a hollow swivel barrel having a pair of wire openings in opposite sides thereof;

a first swivel wire having first and second ends, and having a single loop on said first end of said first swivel wire extending around said elongated wire shaft at a location between said eye and said one spherical spacer element, said first swivel wire extending through one of said wire openings into said swivel barrel and having its second end within said hollow swivel barrel;

a first swivel ball secured to the second end of said first swivel wire and located inside of said swivel barrel so that said swivel barrel can swivelly rotate therearound;

a second swivel ball located inside said swivel barrel so that said swivel barrel can swivelly rotate therearound.

a second swivel wire having a first end connected to said second swivel ball and having a second end in the form of a loop;

a spinner blade connected to the loop at the second end of said second swivel wire; and

a hook pivotally connected to the second end of said wire shaft.

4,998,372

ARTIFICIAL FISHING LURE

Herb Reed, 64 Nutmeg Dr. #A, Meriden, Conn. 06450-2870

Filed Nov. 3, 1989, Ser. No. 431,577

Int. Cl.[5] A01K *85/00*

U.S. Cl. 43—42.24 **15 Claims**

1. An artificial fishing lure, comprising:

an elongate, straight line, radially asymmetrical body of soft flexible elastomeric material;

said body having a generally U-shaped cross section and a concave top surface, said top surface extending along substantially the entire length of said body;

said body having a plurality of non-stabilized segments including a leading segment and a trailing segment, each of said segments having a terminating end and a coupling end, and

hinge means for coupling said leading segment and said trailing segment together at said respective coupling ends, said hinge means comprising intersecting axes of flexure for imparting a compound motion to said plurality of segments as said lure moves through a body of water, said lure moving with a random and erratic motion along an unpredictable path.

4,998,373

DOUBLE HOOK LURE

Odell W. Braswell, 405 S. Willow Ave., Cookeville, Tenn. 38501

Filed Sep. 19, 1988, Ser. No. 246,418

Int. Cl.[5] A01K *83/00*

U.S. Cl. 43—42.37 **10 Claims**

1. A double hook lure comprising:

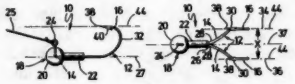
a pair of elongate shanks each having a base end and a piercing end with a sharp tip and an associated barb on the piercing end;

support means for supporting said shanks in close proximity to one another adjacent their base ends and in such a

manner as to restrict relative movement between said shanks;

attachment means substantially fixedly connected to said support means for attachment of the lure to a fishing line so that the lure is retrieved through the water in a travel direction under the influence of a force exerted on the line generally longitudinally thereof, said shanks being supported by said support means in substantially fixed relation to said attachment means to restrict pivotal movement of the shanks with respect to the attachment means;

a first bend formed in each shank adjacent said support means and configured to cause said shanks to diverge from



one another in a shank plane extending from adjacent said support means to dispose said piercing ends in spaced apart relation;

a bight formed in each shank adjacent said piercing end in spaced relation to said first bend, each of said bights having a curvature of about 180° so that said tips of said piercing ends points in directions toward said support means substantially along piercing lines that are parallel to and spaced from said shank plane; and

a second bend formed in each shank and configured to dispose said tips of said piercing ends so that the piercing lines are substantially parallel to one another and to the travel direction.

4,998,374

ROTATING FISHING LURE SPREADER FOR USE WHILE TROLLING

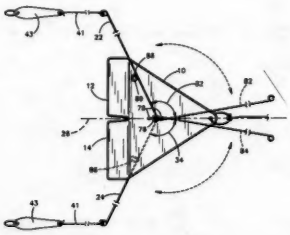
O. Lynn Barnett, 39 Elora Ave., Akron, Ohio 44319

Filed Mar. 29, 1990, Ser. No. 502,108

The portion of the term of this patent subsequent to May 1, 2007, has been disclaimed.

Int. Cl.[5] A01K *91/00*

U.S. Cl. 43—42.74 **11 Claims**



1. A rotatable spreader for use in fishing and specifically for trolling, said spreader comprising:

a substantially planar body having a surface area on each side thereof and having a leading edge adapted at the forwardmost portion thereof for connecting to a fishing line and a trailing edge adpated to cause rotation of said body about a longitudinal axis thereof when said body moves relative to the surrounding water; and

a plurality of elongate sweep arms extending beyond the area of said body, said sweep arms each being pivotably attached at the proximal end thereof to said body such that each may be selectively moved from a use position, in which position said sweep arm forms an obtuse angle with said longitudinal axis of said body with said arm resting upon a stop means protruding from a respective said surface area of said body, to a storage position, in which position said sweep arms are juxtaposed, and wherein each said sweep arm is adapted on the distal end thereof for the attachment of additional fishing tackle for attracting and hooking a fish, said sweep arms rotating with said planar body and thereby causing said additional tackle to revolve in a substantially helical path relative to said surrounding water.

4,998,375

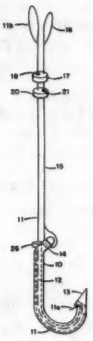
RETRACTABLE WIRE BARB FOR FISH HOOK

Jack H. Mitchell, 80 N. Policy St., Salem, N.H. 03079

Filed Jan. 23, 1990, Ser. No. 467,933

Int. Cl.[5] A01K *83/00*

U.S. Cl. 43—43.16 **6 Claims**



1. A fish hook for use with a fishing line, said fish hook comprising:

a curved, elongated member having a first end and a second end;

a wire that passes from said first end to said second end of said elongated member, said wire having a first end that extends beyond first end of said elongated member to provide a barb to said fish hook, and said wire having a second end that extends beyond said second end of said elongated member and force is applied to said second end of said wire to displace said wire a small distance so that said first end of said wire does not extend beyond said first end of said elongated member to thereby retract said barb;

a leader attached to said elongated member at said second end, said leader being used to attach said hook to said fishing line;

a first indicator element attached to said leader and having a first hole through it through which said wire passes and moves freely; and

a second indicator element attached to said wire and having a second hole through it through which said leader passes and moves freely, and as force is applied to said wire to retract said barb end of said wire said second indicator element moves toward said first indicator element, and when they touch it provides a visual indication that said barb is fully retracted.

4,998,376

INSECT TRAP

Jack Scherbak, 6250 Sunrise Rd., Lincoln, Nebr. 68510

Filed Apr. 25, 1990, Ser. No. 514,085

Int. Cl.[5] A01M *1/10*

U.S. Cl. 43—61 **4 Claims**

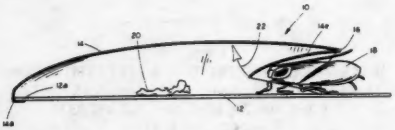
1. An insect trap comprising:

a base having a continuous peripheral edge;

a lightweight cover of flexible sheet material, of a weight capable of permitting an insect to lift one layer to pass

thereunder and having dimensions greater than the base, affixed along portions of the peripheral edge of said base to form a continuous seal along portions of the base edge;

said cover having flap portions formed by each location at the cover's edge which is not affixed to said base, folded



under said cover to project between said cover and said base;

said cover being affixed to said base such that the fold between each said flap portion and the cover is arched upwardly away from the base to create a downward biasing force on each said flap portion.

4,998,377

METHOD OF KILLING PESTS

Teruyuki Tsutsumi; Tetsunori Sato, and Akira Arita, all of Mihara, Japan, assignors to Teijin Chemicals, Ltd., Tokyo, Japan

Filed Apr. 9, 1990, Ser. No. 506,239
Claims priority, application Japan, Apr. 10, 1990, 1-88097
Int. Cl.[5] A01M *13/00*
U.S. Cl. 43—125 **3 Claims**

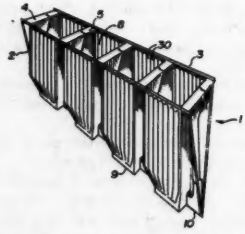
1. A method of killing pests parasitic on fresh plants, which comprises maintaining the fresh plants in a mixed gaseous atmosphere composed of 10 to 50 mg/liter of methyl bromide, 0.01 to 10 mg/liter of hydrogen phosphide and 1 to 50% by volume of carbon dioxide for at least 1 hour.

4,998,378

BOOK-TYPE CONTAINER FOR RAISING SEEDLINGS

Henry A. Spencer, 8005 - 137 Street, Edmonton, Alberta, Canada T5R 0C1

Filed Aug. 3, 1990, Ser. No. 562,533
Claims priority, application United Kingdom, Aug. 5, 1989, 8917976
Int. Cl.[5] A01G *9/02*
U.S. Cl. 47—77 **2 Claims**



1. A book-type container for growing seedlings comprising:

a pair of opposed first and second wall members, each formed of flexible, substantially non-porous sheet plastic material, each wall member being formed by a series of spaced, inwardly projecting elongate shoulders integrally joined by webs, each of said shoulders having a base, the shoulders of the first wall member being mutually opposed relative to the shoulders of the second wall member, said mutually opposed shoulders being adapted to engage when the wall members are pressed together to combine with the webs to form a series of open-topped cells, said wall members being joined at said bases of each pair of opposed shoulders by hinge means, each opposed pair of webs combining With the adjacent shoulders to form an air-pruning opening at the base of the cell;

each pair of opposed shoulders comprising first and second shoulders forming part of the first and second wall members respectively;

each first shoulder having parallel, adjacent, longitudinally extending low and high ledges, said ledges being about equal in width and extending continuously substantially the full extent of the first wall member, whereby the ledges combine to form an elongate recess along one side of the first shoulder, said first shoulder having an inner and outer end and means at its outer end forming an open socket that is substantially centrally positioned relative to the first shoulder axis;

each second shoulder having low and high ledges substantially the same in form as those of the first shoulder except that the positioning of the low and high ledges is reversed, whereby the high ledge of the first shoulder may seat in the recess of the second shoulder and vice versa when the container is closed and the wall members are pressed together, said second shoulder having an inner and outer end and means at its outer end forming a prong that is substantially centrally positioned relative to the second shoulder axis and is configured to have a fractional fit with the socket of the first shoulder;

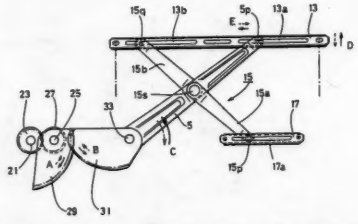
whereby the ledges of the first and second shoulders may interlock in continuous fashion without crossover along substantially the entire extent of the shoulders in the closed position and the disengageable prong and socket means pin the shoulders together at their outer ends in the closed position.

4,998,379

VEHICLE WINDOW REGULATOR

Takahiro Yamada; Kazuyoshi Kurahashi, both of Aichi, and Shyuji Watanabe, Osaka, all of Japan, assignors to Asmo Co., Ltd., Kosai; Nippondenso Co., Ltd, Kariya and Daihatsu Motor Co., Ltd., Ikeda, all of, Japan

Filed Jul. 24, 1989, Ser. No. 383,593
Claims priority, application Japan, Jul. 25, 1988, 63-184895
Int. Cl.[5] E05F *15/00*
U.S. Cl. 49—138 **7 Claims**



1. A vehicle window regulator for opening and closing a vehicle window in response to a rotary input, comprising:

a first gear driven by the rotary input for rotation about a first axis, said first gear having a first curved periphery defining a varying radius with respect to said first axis, and

a second gear operably connected to the window and rotatable about a second axis, said second gear having a second curved periphery defining a varying radius with respect to said second axis, said second periphery meshing with said first periphery so that rotation of said first gear is transmitted to said second gear for displacing the window between fully open and fully closed positions,

a first radius extending between said first axis and a meshing location of said first and second gears, said first radius forming a ratio with a second radius extending between said second axis and said meshing location, said ratio changing as said window travels such that said ratio is smallest when the window is at a fully closed end of its

displacement and said ratio is largest when the window is at a fully open end of its displacement, whereby a travel velocity of the window is slower adjacent said fully closed end of window replacement and faster adjacent said fully open end of window replacement.

4,998,380

DOOR CORNER EDGE GUARD

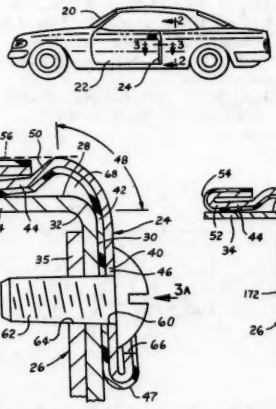
Robert Adell, Sunnyvale, Tex., assignor to Adell Corporation, Sunnyvale, Tex.

Continuation of Ser. No. 188,302, Apr. 29, 1988, abandoned, which is a continuation of Ser. No. 64,831, Jun. 22, 1987, Pat. No. 4,741,126, which is a continuation-in-part of Ser. No. 840,351, Mar. 17, 1986, Pat. No. 4,674,233. This application Dec. 27, 1988, Ser. No. 291,394

The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.

Int. Cl.[5] B60J *5/00*

U.S. Cl. 49—462 6 Claims



1. In combination with the trailing edge of a swinging closure of an automobile wherein the trailing edge is defined by surfaces to form a corner, one of said surfaces being an exterior surface of the automobile which is visible when the swinging closure is in closed position and the other surface being an end surface that is generally transverse to said exterior surface, a decorative and protective corner edge guard for protecting said corner comprising an elongate metal channel protectively fitting over at least a portion of the length of said corner and having an outer leg disposed against said exterior surface and a back leg disposed against said end surface, fastening means disposed between one of said legs and the corresponding underlying surface for holding said one leg against the corresponding underlying surface such that as viewed in transverse cross section said fastening means is located at a central region of said one leg, and said corner edge guard being constructed and arranged such that concurrently with the action of said fastening means in holding said one leg against the corresponding underlying surface, a portion of the other leg is also forcefully urged against its corresponding underlying surface by the distance from the location of action of said fastening means on the corresponding surface underlying said one leg to the corresponding surface underlying the other leg relative to the distance from the location of action of said fastening means on said one leg to said portion of the other leg, said fastening means being constructed and arranged to have a manner of attachment to said one leg and to the corresponding underlying surface to preclude any appreciable shifting of said one leg on the corresponding underlying surface which would result in said portion of said other leg losing forceful engagement with the corresponding underlying surface.

4,998,381

INSPECTION COVER ARRANGEMENT

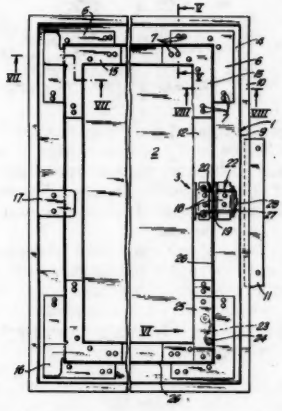
Günter Langenhorst, Kirchstrasse 2, D-4772 Bad Sassendorf 4, Fed. Rep. of Germany

Filed Nov. 20, 1989, Ser. No. 439,264

Claims priority, application Fed. Rep. of Germany, Nov. 24, 1988, 3839673

Int. Cl.[5] E06B *3/32*

U.S. Cl. 49—463 13 Claims



1. An inspection cover arrangement, comprising: an inspection frame (1) installable in a wall or a ceiling; an inspection cover (2) insertable into the inspection frame (1); at least one snap-in lock (3) for the inspection cover (2) arranged on a rear side of the inspection frame (1) and the inspection cover (2), the inspection frame (1) including a frame section (4) of a material with a melting point lower than that of steel; a steel retention section (5) arranged so as to back up the frame section (4) of the inspection frame (1); steel corner angles (6) arranged at least in a region of a corner of the frame so as to overlap the frame section (4), so that the retention section (5) backs up the frame section (4) when the corner angles (6) overlap the frame section (4); and means for connecting the steel retention section (5) and the corner angles (6) with each other, the connecting means passing through the frame section (4) of the inspection frame (1).

4,998,382

INSULATED REFRIGERATOR DOOR ASSEMBLY WITH SUBSTANTIALLY ALL GLASS FRONT DOORS

Jeffery Kostos; Melvin Kaspar, both of La Grange Park, and Paul Artwohl, Flossmoor, all of Ill., assignors to Ardco, Inc., Chicago, Ill.

Filed Dec. 11, 1989, Ser. No. 448,328

Int. Cl.[5] E06B *3/00*

U.S. Cl. 49—501 33 Claims

1. A refrigerator door assembly comprising

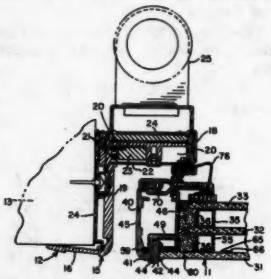
a metal cabinet frame for mounting in an opening of a refrigerator cabinet,

an insulated glass door mounted for pivotal movement relative to said cabinet frame,

said door including a glass unit having a plurality of glass panes disposed in side-by-side relation including a forward glass pane and a rear glass pane, a spacer interposed between adjacent panes for maintaining said panes in parallel relation with an air space therebetween, and means sealing said air space from the outside environment;

an outer metal frame about the periphery of said glass unit for supporting the weight of said glass unit;

said metal frame having a forward perimeter portion in the



plane of said forward glass pane disposed in outwardly spaced relation to the peripheral edge of said forward glass pane, said forward perimeter portion does not extend in front of said forward glass pane, thus for defining a forwardly opening space about the peripheral edge of said forward glass pane; and

a moulding disposed within said space between said forward frame perimeter portion and the peripheral edge of said forward glass pane, said molding having a forward end extending over a front side of said frame perimeter portion and a front side of said forward glass pane for bridging and covering the space therebetween.

4,998,383

MEANS FOR RESETTING A CYLINDRICAL GRINDING MACHINE

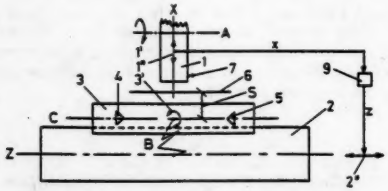
Werner Waelti, Selzach, Switzerland, assignor to Werkzeugmaschinenfabrik Tschudin, Grenchen, Switzerland

Division of Ser. No. 102,019, Sep. 2, 1987, Pat. No. 4,928,437. This application Mar. 19, 1990, Ser. No. 495,089

Claims priority, application Switzerland, Nov. 25, 1985, 5042/85

Int. Cl.[5] B24B *49/00*

U.S. Cl. 51—165.71 **6 Claims**



1. A cylindrical grinding machine comprising:

at least one grinding wheel having a rotational axis A;

first rotation means for supporting said at least one grinding wheel for rotation about said axis A and for rotating said at least one grinding wheel about said axis A, said first rotation means being translatable along an axis X, said axis X being perpendicular to said axis A;

first support means for supporting said first rotation means for translation along said X axis and for translating said first support means along said X axis;

a turning slide translatable along an axis Z;

second support means for supporting said turning slide for translation along said axis Z and for translating said turning slide along said axis Z;

a rotary table having a rotational axis B, said axis B being perpendicular to said axis Z;

third support means, disposed on said turning slide, for supporting said rotary table on said turning slide for rotation about said axis B;

a pair of adjustable turning centers, mounted on said rotary table, for supporting a workpiece which is to be ground, said pair of adjustable turning centers defining an axis C;

second rotation means, disposed on said turning slide, for rotating said rotary table about said axis B;

numerical control computer means, operatively connected to said first support means, said second support means and said second rotation means for controlling relative movement between said at least one grinding wheel, said turning slide and said rotary table.

4,998,384

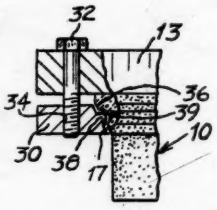
GRINDING WHEEL MOUNTING MEANS

William L. Bouchard, Washington, N.H.; Robert E. Cummings, Brantford, Canada; Paul W. Kalinowski, Boylston, Mass., and Charles W. Sudol, Hillsboro, N.H., assignors to Norton Company, Worcester, Mass.

Filed Sep. 1, 1989, Ser. No. 403,204

Int. Cl.[5] B24B *41/00*

U.S. Cl. 51—168 **8 Claims**



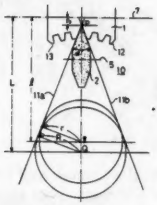
1. The combination of a chuck means for mounting a grinding wheel on a grinding machine which machine is constructed and arranged to drive said wheel to rotate about a longitudinal axis of a driving spindle, and said grinding wheel being adapted to be mounted in said chuck means to be rotated about said axis with a grinding surface of said wheel being disposed at a right angle to said axis comprising a disk adapted to be connected to the spindle of said machine to be rotatably driven, interengaging means for frictionally coupling said grinding wheel to said disk, said interengaging means being adapted to be coupled with said driving disk to rotate therewith, said grinding wheel having a configured bearing end oppositely disposed from said grinding end that is adapted to be frictionally engaged by said interengaging means, said interengaging means carrying a contacting surface for engaging said configured end of said grinding wheel, said contacting surface being complimentarily configured to intimately engage with the configured end of said grinding wheel, the configured end of said grinding wheel is a conical shape, said contacting surface has a complimentary conical shape, and wherein said conical shape of said grinding wheel and said complimentary shaped interengaging means are provided with interfitting ridge and groove means.

4,998,385

METHOD OF MODIFIED GEAR CUTTING OF A GLOBOID WORM GEAR

Shiro Umezono, and Minoru Maki, both of Yokohama, Japan, assignors to Nippon Gear Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 140,088, Dec. 31, 1987, abandoned.
This application Oct. 19, 1989, Ser. No. 423,647
Claims priority, application Japan, Sep. 22, 1987, 62-236356
Int. Cl.[5] B23F *11/00*
U.S. Cl. 51—287 2 Claims



1. A method of cutting a globoid worm gear adapted to engage the toothed surface of a cooperatively associated worm wheel comprising the steps of:

(a) providing a worm wheel gear cutting tool having conical cutting surfaces formed thereon, the profile thereof being substantially the same as the surfaces of the globoid worm wheel;

(b) rotating the conical cutting surfaces of the worm wheel gear cutting tool at a rate proportional to that applied to the globoid worm gear;

(c) cutting the tooth surfaces of a worm wheel with the worm wheel gear cutting tool and forming a reciprocal image therein of the conical cutting surface of said cutting tool; and

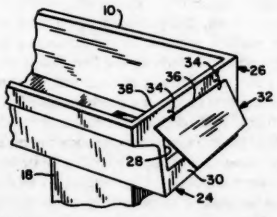
(d) cutting the globoid worm gear by imparting to the conical cutting surfaces of the cutting tool a motion defined by a lead angle of engagement determined from (i) the distance between the axis of the worm gear and the center of rotation of the cutting tool, and (ii) the ratio between the rate of rotation of the cutting tool and the rate of rotation of the worm gear, both of which are increased from the values used to generate the conical cutting surfaces of the cutting tool.

4,998,386

ANTI-CLOG CAPS FOR RAIN GUTTERS AND THE LIKE

Arnold E. Baumgarth, 15 Judy Ct., Centerport, N.Y. 11721

Filed Apr. 23, 1990, Ser. No. 512,888
Int. Cl.[5] E04D *13/06*
U.S. Cl. 52—16 2 Claims



1. An end overflow apparatus for a rain gutter being of a straight length formed for mounting along and under the overhang of a roof of a building and cooperating with a leader attached thereto, said apparatus comprising means for allowing rain water to overflow the end of the rain gutter when both the rain gutter and the leader are clogged with debris whereby a downpour of rain water is too much for the clogged rain gutter and the leader to normally handle wherein said means includes:

(a) an end cap mounted on the end of the rain gutter near the attachment of the leader, said end cap having an aperture therethrough to provide a raised bottom portion on said end cap;

(b) a door sized to fit over and cover the aperture in said end cap; and

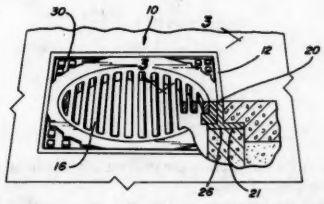
(c) a hinge means connected between the top edge of said door and a top portion of said end cap over the aperture so that said door can swivel open to allow the rain water to overflow the raised bottom portion for exiting therefrom when the rain gutter and the leader are clogged.

4,998,387

COVER ASSEMBLY FOR A GROUND OPENING

Robert A. Geiger, 356 W. Puce Rd. R.R. #1, Belle River, Ontario N0R 1A0, Canada

Filed Sep. 25, 1989, Ser. No. 411,651
Int. Cl.[5] E02D *29/14*
U.S. Cl. 52—20 5 Claims



1. A cover assembly for a ground opening comprising:

a cover,

a frame, said frame having a top, a bottom and a tubular sidewall section, said sidewall section having an interior wall open to said top and said bottom,

said frame having an abutment portion which protrudes into said tubular sidewall section adjacent the bottom of said frame,

a core, said core being slidably insertable into said tubular sidewall section of said frame so that a bottom of said core abuts against said abutment portion,

said core having a tubular through opening and an inwardly extending annular abutment surface at a midpoint of said core through opening, said core annular abutment surface being dimensioned to receive and support said cover across an upper end of said core so that a bottom of said cover is spaced upwardly from said frame abutment portion,

means for adjusting the vertical position of said core with respect to said frame comprising at least one shim inserted between said frame abutment portion and a bottom of said core.

wherein said frame is constructed of metal,

wherein said core is constructed of a non-metallic material.

4,998,388

PREFORMED UNITIZED CLOSET

Gregory R. Englehart, 12637 - 25A Avenue, Surrey, British Columbia, Canada V4A 5R4

Filed Jan. 21, 1988, Ser. No. 147,158
Int. Cl.[5] A47G *29/02*
U.S. Cl. 52—36 8 Claims

1. A performed storage unit, having a lengthwise axis and a transverse axis, for installation within a building wall frame opening which is formed by first and second spaced apart upstanding framing members, the storage unit comprising:

a. an interior compartment portion having an inner surface and an outer surface, and further including first and sec-

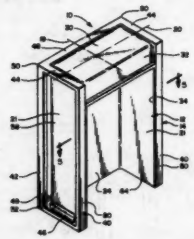
ond upstanding sidewalls which are integrally joined to an upstanding transverse rear wall;

b. an exterior frame including an inner surface which is positioned about the outer surface of the interior compartment portion, and an outer surface, the exterior frame including

(1) a lower base including first and second lengthwise horizontal members which are connected to a rear transverse horizontal member,

(2) an upper base including first and second lengthwise members which are connected to a rear transverse horizontal member, and

(3) first and second upstanding members which are connected between forward end portions of the first and second lengthwise members of the upper and lower base, respectively;



c. means for connecting the interior compartment portion to the exterior frame;

d. means for fastening the first and second upstanding members of the exterior frame to the first and second upstanding framing members;

e. said first and second upstanding sidewalls each including an integral horizontal portion supporting a platform thereon, said sidewalls each having a sidewall portion which slants downwardly toward an interior area of the interior compartment portion in a manner that edges of the two ledge portions that are adjacent to the two sidewalls are positioned more closely to one another than interior surfaces of said sidewalls other than the sidewall portions above the ledges, whereby the sidewalls of the closet may be made greater than a standard dimension, while the ledges are able to provide a support platform of a standard dimension.

4,998,389

VARIABLE PITCH ROOF RIDGE BEAM ASSEMBLY AND COMPONENTS THEREOF

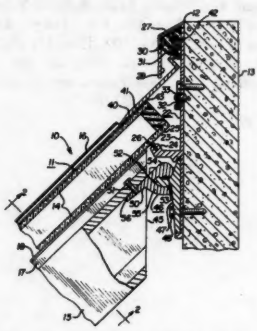
William V. Pritts, Scottdale, Pa., assignor to Outside-In, Inc., Connellsville, Pa.

Filed Feb. 6, 1990, Ser. No. 475,457

Int. Cl.[5] E04B *7/06*

U.S. Cl. 52—90 **14 Claims**

1. A variable pitch ridge beam assembly for supporting roof panels at selectable pitch angles comprising, an elongated generally horizontally extending ridge beam forming a ridge support for roof panels and having a generally vertically extending base portion, a ledge projecting laterally from and extending generally horizontally along said base portion for contacting the upper edge of roof panels thereon, a generally horizontally extending drip flange projecting laterally outward from the base portion above said ledge and having a downwardly open cap channel coextending therewith over said ledge, elongated elastomeric means received in said cap channel with sealing engagement, said elastomeric means having a downwardly open flange channel coextending therewith, and an elongated ridge cover flange for extending over the top of the upper edge of roof panels to be contacted on said ledge and having a generally upwardly extending and coextending flange extension portion received in said flange channel with sealing engagement thereby permitting said ridge cover flange to



pivotally adjust vertically to mate with the pitch of roof panels to be covered thereby at their upper ends.

4,998,390

PANEL SUPPORT STRUCTURE

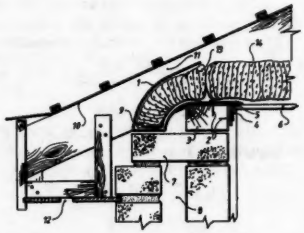
John E. S. Glover, Angmering, and Timothy N. Glover, Worthing, both of England, assignors to Thermabate Limited, Angmering, England

Filed Aug. 14, 1989, Ser. No. 393,694

Claims priority, application United Kingdom, Aug. 16, 1988, 8819398; Jan. 26, 1989, 8901744

Int. Cl.[5] E04B *1/76*

U.S. Cl. 52—95 **13 Claims**

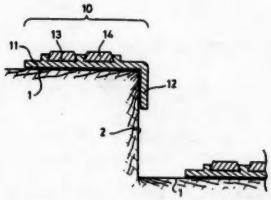


1. An elongate supporting strip for supporting a ceiling panel edge adjacent a wall, comprising a first flange adapted to be fixed to the wall, a second flange extending longitudinally substantially perpendicularly to the first flange and adapted to overlie the panel in its final position, and locating means extending from the first flange at a predetermined distance below the second flange and adapted to engage the underside of the panel in its final position, wherein the locating means extending from the first flange comprises a plurality of bendable portions of the first flange attached to the remainder of the first flange at bend lines extending substantially perpendicularly to the length of the strip, wherein two series of bendable portions are formed in the first flange, the edges of the bendable portions facing the second flange being spaced therefrom by the first distance for the first series and by a second distance for the second series, so that by selectively bending only the bendable portions of one or other series panels of two distinct thicknesses may be accommodated.

4,998,391
STRUCTURAL ELEMENT

Raymond A. Connew, Colchester, England, assignor to Shinebuild Limited, Suffolk, England

PCT No. PCT/GB88/00107, § 371 Date Oct. 11, 1989, § 102(e) Date Oct. 11, 1989, PCT Pub. No. WO88/06218, PCT Pub. Date Aug. 25, 1988
PCT Filed Feb. 22, 1988, Ser. No. 399,472
Claims priority, application United Kingdom, Feb. 23, 1987, 8704111
Int. Cl.[5] E04F *15/00*
U.S. Cl. 52—179 5 Claims

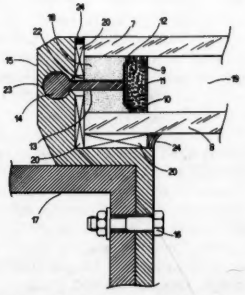


1. A device comprising a generally planar member adapted to be mounted upon or adjacent the leading edge of the horizontal tread portion of a step of a staircase and extending rearwardly over part or all of the width of the step, which rearwardly-extending portion of the member is provided with at least one recess extending widthwise of the member and accommodating at least one light-emitting element, wherein the or each element comprises a strip of a flooring grade plastic sheet material which comprises a base layer having a reflective upper surface, an intermediate layer incorporating photoluminescent material and an upper translucent, wear-resistant layer, said upper layer of the or each element having an exposed upper face disposed above the remainder of the device.

4,998,392
DEVICE FOR MOUNTING INSULATING DOUBLE-GLAZING ONTO A FIXED FRAME

Liberto Massarelli, and Roberto Sampaolesi, both of Vasto, Italy, assignors to Società Italiana Vitro-SIV-S.p.A., San Salvo CH, Italy

Filed Mar. 12, 1990, Ser. No. 491,852
Claims priority, application Italy, Mar. 15, 1989, 47742 A/89
Int. Cl.[5] E06B *3/66*
U.S. Cl. 52—208 15 Claims



1. In combination with insulating double-glazing formed by two sheets of glass held in place by a spacer bonded thereto, and a first sealant filling a space defined between said spacer and peripheral edges of said sheets of glass, a device for mounting the double-glazing to a fixed frame of border structure defining an opening in a wall, said device comprising:

a first elongate connecting member extending along at least one pair of opposite peripheral edges of said sheets of glass, said first elongate connecting member including a strip portion at least partially embedded edgewise in said first sealant so as to be bonded to said sheets of glass at the edges thereof, and a pivot portion integral with said strip portion at a free edge thereof, said pivot portion comprising a plurality of sphere-shaped elements defining a pivotal axis parallel to the at least one pair of peripheral edges of said sheets of glass;

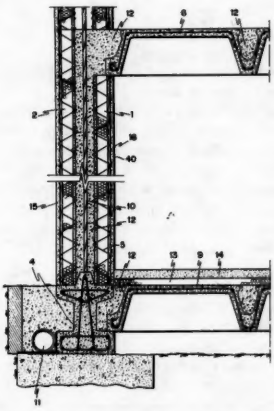
a second elongate connecting member having a receiving portion defining a longitudinally extending bore therein and in which bore said pivot portion of the first connecting member is housed with the pivotal axis defined thereby extending parallel to the longitudinal axis of said bore, and a mounting portion coextensive with said receiving portion; and

means for fixing said mounting portion to the frame such that the insulating double-glazing is capable of being fixedly mounted to the border structure through a pivotal connection established between said pivotal portion and said receiving portion to allow a partial relative deformation of said sheets of glass and the structure.

4,998,393
CONSTRUCTION OF BUILDINGS

Juan A. M. Baena, Campo de Volantin, Bilbao, Spain 8 48007

Continuation of Ser. No. 211,583, Jun. 27, 1988, abandoned.
This application Sep. 11, 1989, Ser. No. 407,728
Claims priority, application Spain, Jul. 1, 1987, 8701926; Jan. 5, 1988, 8800011
Int. Cl.[5] E04B *2/40*
U.S. Cl. 52—236.9 5 Claims



1. Improvements in the construction of buildings, comprising prefabricated panel structures provided with insulating material and having external walls (15, 16), said panel structures including panels (1, 2) arranged in pairs and the panels (1, 2) of each pair being in parallel with each other and positioned at a predetermined distance therebetween; means (3) for maintaining relative parallel position of said panels; means (4) for supporting and coupling said panels to a base (9) of a building; a plurality of means (20, 21, 22) for coupling said panel structures with each other; means (12, 6; 12, 9) for coupling said panels to a storey of a building immediately above or below a storey formed of said panel structures, said panels in each pair defining therebetween a hollow space filled with concrete constituting a connecting element to couple the panels of each pair to each other whereby said panels in each panel structure serve as a container for said concrete to provide a stable assembly to simultaneously form an internal and an external structure of the building, said means (20, 21, 22) for coupling said panel structures each including a profile element (20, 21, 22)

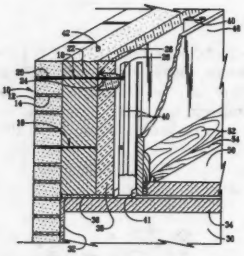
attached to an external wall of a panel and a connecting member (27) totally embedded in a respective external wall made of concrete, said connecting member having a base portion (32) a threaded cylindrical portion (31) which projects at right angles from said base portion towards an outer face of said panel, said cylindrical portion being accessible from an outside of the panel through a hole provided in each panel at said element, and fastening means (26) received in said cylindrical portion.

4,998,394

MASONRY WALL STRUCTURE AND METHOD OF MAKING THE SAME

Robert C. Holzapfel, Arlington Heights, Ill.; Michael P. Mottet, Bettendorf, Iowa, and Thomas W. Riggle, Phoenix, Ariz., assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Apr. 10, 1989, Ser. No. 335,437
Int. Cl.[5] E04B *2/04, 2/58, 3/86*
U.S. Cl. 52—426 **4 Claims**



1. A wall structure comprising:

a veneer wall comprised of a plurality of masonry units held together by mortar joints

a plurality of straight horizontal tie members having opposite first and second ends and a center portion, with said first ends of said tie members being embedded in one of said mortar joints to cause said tie members to extend horizontally outwardly with respect to said veneer wall,

insulation panels having inner and outer sides and extending in spaced parallel relation to said veneer wall, with said panels being secured to the second ends of said tie members,

a rigid stud wall comprising a plurality of spaced rigid elongated members positioned adjacent the outer side of said insulation panels,

and solid poured-in-place concrete filling the space between said insulation panels and said veneer wall and embedding said tie members therein.

4,998,395

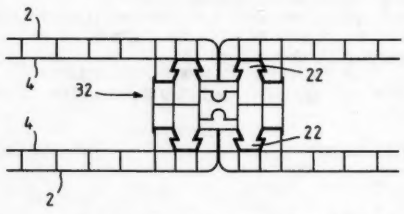
LIGHT-TRANSMITTING WALL PANELS

Baruch J. Bezner, 124 Ibn-Gvirol Street, Tel-Aviv, Israel

Filed May 19, 1989, Ser. No. 354,472
Claims priority, application Israel, May 20, 1988, 86461
Int. Cl.[5] E04B *1/02*
U.S. Cl. 52—563 **10 Claims**

1. In an extruded, modular panel unit for the construction of wall-surface portions, including light-transmitting wall-surface portions, comprising at least two sheet-like major surfaces interconnected and spaced apart by a plurality of ribs dividing the space delimited by said major surfaces into a plurality of subspaces, and having joining flanges extending in the direction of extrusion at each extruded edge of one major surface of said panel unit, the improvement wherein said joining flanges comprise:

a pair of parallel spaced-apart projections, each projection having a detent on an inside surface thereof which faces the opposite projection of the pair, said detents of the pair cooperating to provide a detent means for locking said



panel unit coplanarly adjacent to another identical panel unit.

4,998,396

INTERLOCKING PANELS

Michael J. Palmersten, 3110 Hillside La., Safety Harbor, Fla. 34695

Filed Apr. 4, 1990, Ser. No. 504,488
Int. Cl.[5] E04B *1/80;* **E04C** *1/10*
U.S. Cl. 52—595 **5 Claims**

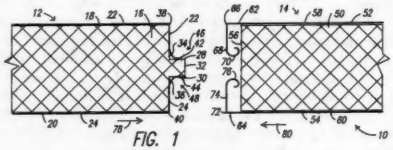


FIG. 1

1. A panel construction that facilitates edge-to-edge interlocking of panels, comprising:

a first panel;

said first panel having a flat top wall, a flat bottom wall, and a plurality of edge walls therebetween;

an outwardly extending tongue member formed in a preselected edge wall of said panel, said tongue member being coextensive with said preselected edge wall and being positioned equidistantly from said top and bottom walls;

said tongue member having a top wall, a bottom wall and an edge wall;

a first thin, flexible sheet of metal disposed in overlying relation to said panel top wall;

said first sheet of metal having a substantially right angle bend formed therein at said preselected panel edge wall, said first sheet having a downwardly extending part disposed in overlying relation to a part of said preselected panel edge wall above said tongue member top wall;

a first trough member formed integrally with said downwardly extending part, said first trough member being disposed in overlying relation to said tongue member top wall;

a second thin, flexible sheet of metal disposed in overlying relation to said panel bottom wall;

said second sheet of metal having a substantially right angle bend formed therein at said preselected panel edge wall, said second sheet having an upwardly extending part disposed in overlying relation to a part of said preselected panel edge wall below said tongue member bottom wall;

a second trough member formed integrally with said upwardly extending part, said second trough member being disposed in overlying relation to said tongue member bottom wall;

a second panel;

said second panel having a flat top wall, a flat bottom wall, and a plurality of flat edge walls therebetween;

a third thin, flexible sheet of metal disposed in overlying relation to said second panel top wall;

said third sheet extending outwardly beyond a preselected edge wall of said second panel in substantially coplanar relation to said second panel top wall;

a substantially right angle bend being formed in said third sheet at a preselected distance from said second panel preselected edge wall, said third sheet having a downwardly extending part disposed in parallelism to said second panel preselected edge wall;

said third sheet downwardly extending part including an integral, inwardly projecting curled distal free end;

a fourth, thin flexible sheet of metal disposed in overlying relation to said second panel bottom wall;

said fourth sheet extending outwardly beyond said preselected edge wall of said second panel in substantially coplanar relation to said second panel bottom wall and in parallelism to said third sheet;

a substantially right angle bend being formed in said fourth sheet at a preselected distance from said second panel preselected edge wall, said fourth sheet having an upwardly extending part disposed in parallelism to said second panel preselected edge wall and in substantially coplanar relation to the downwardly extending part of said third sheet;

said fourth sheet upwardly extending part including an integral, inwardly projecting curled distal free end;

said downwardly extending parts of said first, second, third and fourth sheets being substantially equal in extent to one another;

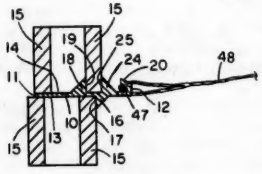
whereby edge-to-edge interlocking of said first and second panels is accomplished when said tongue member edge wall is placed into abutting relation to said preselected edge wall of said second panel.

4,998,397

ALIGNMENT AND LATERAL SUPPORT MEMBER FOR USE IN LAYING COMMON CONCRETE BLOCKS

Michael V. Orton, 302 W. 100 South, Manti, Utah 84642

Filed Nov. 17, 1989, Ser. No. 438,720
Int. Cl.[5] F04B *1/38*; E02D *29/02*
U.S. Cl. 52—715 **18 Claims**



1. An alignment and lateral support member for use in laying common concrete blocks, said support member comprising

an elongate piece of rigid material, said piece having opposite first and second ends and opposite first and second elongate faces, with said piece further having a length which is greater than the width of concrete blocks with which the support member is to be used;

a first appendage extending from said first face of said piece, said first appendage having a stop surface extending substantially perpendicular to said first face of said piece, with the stop surface of said first appendage being positioned a distance from the first end of said piece so that when the stop surface of said first appendage engages an outer surface of the sidewall of a first concrete block, with said first face of said piece lying adjacent to said first block, said piece spans from one sidewall of said first block to the other sidewall of said first block; and

a second appendage extending from said second face of said piece, said second appendage having a stop surface extending substantially perpendicular to said second face of said piece, with the stop surface of said second appendage being spaced from said stop surface of said first appendage by a set distance along said piece in a direction toward said first end of said piece, whereby the stop surface of said second appendage engages an inner surface of the sidewall of a second concrete block when said second block lies in proper position adjacent to said second face of said piece, the set distance between said top surfaces of said first and second appendages is up to about 1 inch less than the thickness of the sidewall of the concrete blocks with which the support member is to be used.

4,998,398

STACK CAP COVERING SYSTEM

Roy C. Compton, 1833 J and 6/10 Rd., Fruita, Colo. 81521

Division of Ser. No. 758,884, Jul. 25, 1985, abandoned. This application Apr. 6, 1990, Ser. No. 505,914
Int. Cl.[5] B65G *61/00*
U.S. Cl. 52—745 **6 Claims**

1. A method of covering a field crop stack comprising the steps of:

(a) providing open bottom, inverted V-shaped stack cap having a lateral dimension greater than that of a stack to be covered;

(b) engaging laterally opposite lower portions of the stack cap with a pair of elongate mounting poles;

(c) simultaneously pivoting both poles upwardly substantially about a common horizontal pivot axis associated with the lower portions of both poles until the poles are in a substantially vertical orientation;

(d) displacing both poles in a horizontal direction to a position whereat the stack cap is directly above a portion of a crop stack to be covered;

(e) lowering both poles until the stack cap comes to rest on the stack;

(f) disengaging both poles from the stack cap; and

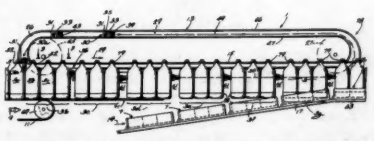
(g) securing the stack cap to the stack.

4,998,399

PET BOTTLE PACKER

Wayne S. Lutzke, Plymouth, and Michael A. Balz, Kiel, both of Wis., assignors to Nigrelli Systems, Inc., Kiel, Wis.

Filed Feb. 6, 1989, Ser. No. 306,561
Int. Cl.[5] B65B *21/06*, *35/44*
U.S. Cl. 53—398 **19 Claims**



18. A method of forming complements of articles from a quantity thereof comprising the steps of:

a. feeding the articles in a downstream direction along an article path at a predetermined speed;

b. extending a bar having a horizontal longitudinal axis across the article path;

c. moving the bar to a penetration station along the article path in a direction having components of motion perpen-

dicular to and parallel to the downstream direction while maintaining the bar longitudinal axis horizontal, wherein the step of moving a bar to a penetration station comprises the step of providing at least first and second bars consecutively spaced apart along the article path, the first and second bars propelling respective consecutive complements in the downstream direction from the penetration station at a speed less than the predetermined speed;

d. temporarily slowing the downstream speed of the articles at the penetration station to a speed less than the predetermined speed;

e. inserting the bar between selected adjacent articles at the penetration station in timed relation with the slowed downstream speed of the articles to contact the selected adjacent articles and form a complement downstream of the bar; and

f. propelling the complement downstream from the penetration station with the bar, wherein the step of temporarily slowing the downstream speed of the articles comprises the steps of:

i. moving the first bar at the pivot station downstream of the penetration station;

ii. pivoting the first bar at the pivot station to create a leading edge thereof that continues in the downstream direction at a speed less than the predetermined speed and a trailing edge that pivots in the upstream direction relative to the leading edge; and

iii. forcing the pivoting first bar trailing edge against the articles upstream therefrom and forcing the articles upstream of the first bar to slow relative to the predetermined speed.

4,998,400

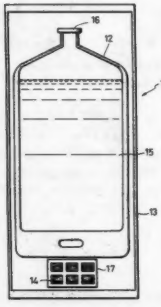
MEDICAL FLUID-FILLED PLASTIC CONTAINER AND METHODS OF MAKING SAME

Tatsuo Suzuki, Machida, and Keinosuke Isono, Kawaguchi, both of Japan, assignors to Material Engineering Technology Laboratory, Incorporated, Tokyo, Japan

Continuation of Ser. No. 139,312, Dec. 29, 1987, Pat. No. 4,872,553. This application Jun. 13, 1989, Ser. No. 365,608

Int. Cl.[5] B65B *55/19, 55/18, 31/02, 11/58*

U.S. Cl. 53—425 **5 Claims**



1. A method of making a plastic container filled with an easily-oxidized medical fluid, which comprises the steps of:

(a) purging a medical fluid, containing a component subject to deterioration by oxygen, of oxygen with an inert gas;

(b) charging an inert gas and the medical fluid into an inner envelope of plastic material and sealing the inner envelope so that substantially no oxygen remains in the medical fluid and the inner envelope;

(c) subjecting the resultant medical fluid-filled inner envelope to steam sterilization under high pressure achieved by introducing an inert gas;

(d) cooling the resultant inner envelope in a substantially oxygen gas-free atmosphere while maintaining approximately the same pressure and drying the outer surface of the inner envelope; and

(e) placing the thus-obtained inner envelope, together with a deoxidizer while maintaining a space around the deoxidizer, into an outer envelope of plastic material having high impermeability to oxygen gas and sealing the outer envelope.

4,998,401

MOWING MACHINE

Akio Terai, Machida; Junichi Yoshino, Tokyo; Shinroku Satsumi, Machida, and Mitsuru Taniguchi, Tokyo, all of Japan, assignors to Komatsu Zenoah Co., Tokyo, Japan

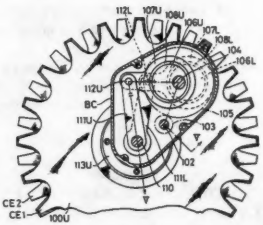
Continuation of Ser. No. 86,496, Aug. 17, 1987, Pat. No. 4,881,363. This application Mar. 15, 1989, Ser. No. 324,011

Claims priority, application Japan, Aug. 26, 1986, 61-198226; Jul. 6, 1987, 62-102664; Jul. 6, 1987, 62-102665

The portion of the term of this patent subsequent to Nov. 21, 2006, has been disclaimed.

Int. Cl.[5] A01D *34/76, 34/68*

U.S. Cl. 56—255 **10 Claims**



1. A mowing machine, comprising:

a motive power source;

first and second pivotal cutting wheels slidably superposed with each other and each provided with a number of grass cutting edges; and

means for oscillating said cutting wheels in opposite directions each through a predetermined angle, respectively, wherein said oscillating means comprises:

(a) a crank shaft rotatably driven by said motive power source;

(b) a first shaft coupled to said first cutting wheel;

(c) a substantially cylindrical second shaft into which said first shaft is rotatably and coaxially inserted and coupled to said second cutting wheel; and

(d) a crank lever mechanism provided between said crank shaft and said first and second shafts for converting a rotational motion of said crank shaft into two oppositely directed oscillating motions of said first and second shafts to oscillate the first and second wheels relative to each other, respectively, with respect to an axis of said shafts through the predetermined angle.

4,998,402

TREE SHAKER FORCE REGENERATOR

Clifford D. Mathews, 8447 Marshall St., Sutter, Calif. 95982

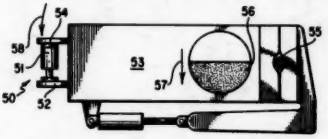
Filed Nov. 16, 1989, Ser. No. 437,128

Int. Cl.[5] A01D *46/26*

U.S. Cl. 56—340.1 **4 Claims**

1. A tree shaking device having a body with a clamping means on one end of said body to secure it to a tree, an eccentric mass attached to said body with said eccentric mass being rotatable about a rotational axis which is generally parallel to a longitudinal axis of said tree, and a means to resist rotational forces of said body about said tree, the means to resist rotational forces being mounted on an opposite end of said body from said clamping means and being a mass with a longitudinal

passage, the mass being mounted on a shaft which is perpendicular to the rotational axis of the eccentric mass, said shaft being mounted between two arms such that said mass can oscillate on



said shaft between said arms, and a resilient means mounted about at least one end of said shaft to allow said mass to compress said resilient means at the end of a stroke of the oscillation.

4,998,403

APPARATUS AND METHOD OF COVERING SPANDEX YARN

Ray Bailey, Candler, N.C., assignor to BASF Corporation, Parsippany, N.J.

Filed Feb. 1, 1990, Ser. No. 473,788
Int. Cl.[5] D02G *3/32, 3/36;* D01H *7/08;* B65H *75/02*
U.S. Cl. 57—18 **3 Claims**

1. An adapter apparatus for an elastic yarn wrapping machine having an arbor for securing the wrapping yarn package against the step ledge, the adapter apparatus consisting essentially of:

(a) a lower circuit plate having a center opening comprising substantially a slip fit over a package section of the arbor, but smaller than the step ledge, said lower plate having a circular groove in one face for receiving the end of the tube support for the wrapping yarn package;

(b) an upper circuit plate having a center opening comprising substantially a slip fit over a package section of the arbor; and

(c) means for securing the lower plate, a wrapping yarn package wound on a tube support and the upper plate in position on said arbor for unwinding the wrapping yarn.

4,998,404

METHOD AND DEVICE FOR REMOVING DETERIORATED FIBRES DURING YARN REJOINING IN AN OPEN-END SPINNING MACHINE

Francesco Ferro, and Claudio Peruch, both of Pordenone, Italy, assignors to Savio S.p.A., Pordenone, Italy

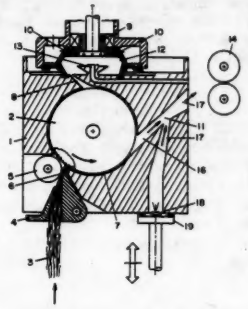
Filed Sep. 20, 1989, Ser. No. 409,676
Claims priority, application Italy, Dec. 23, 1988, 23095 A/88
Int. Cl.[5] D01H *4/32, 4/50*
U.S. Cl. 57—263 **17 Claims**

1. A method of rejoining a separated length of yarn in an open-end spinning machine, wherein the spinning machine comprises a feeding mechanism, a cavity having an aperture, and a rotatable carder, a channel connected to the aperture, and a spinning rotor; wherein sliver is fed by the feeding mechanism to the rotatable carder for producing combed fibers, and the combed fibers are fed from the rotatable carder to the rotor for creating a ring of fibers for forming a length of yarn; the method comprising:

(a) removing fibers from the cavity and from the sliver by withdrawing air through the aperture by a fiber withdrawal means which blows air through the channel;

(b) depositing the combed fibers into the rotor groove after step (a) has been completed; and

(c) inserting the separated length of yarn into the rotor groove so that an end of the separated length of yarn



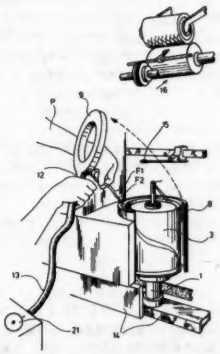
contacts the ring of fibers to form a continuous length of yarn from the separated length of yarn.

4,998,405

TWO-FOR-ONE TWISTING MACHINE

Johannes Frentzel-Beyme, Monchen-Gladbach, Fed. Rep. of Germany, assignor to Palitex Project Company GmbH, Fed. Rep. of Germany

Filed Jan. 18, 1990, Ser. No. 467,049
Claims priority, application European Pat. Off., Feb. 18, 1989, 89102813.6
Int. Cl.[5] D01H *1/10, 7/86*
U.S. Cl. 57—279 **6 Claims**



1. In a two-for-one yarn twisting machine having twisting spindles, each of said spindles including a driven rotor mechanism, a stationary carrier mechanism mounted on said rotor mechanism for carrying feed packages of yarn and having a pot surrounding the feed packages, a yarn passageway extending axially through said carrier mechanism and said rotor mechanism and radially out of said rotor mechanism for receiving yarn threaded therethrough from the feed package, a balloon limiter positioned around said feed package pot and defining a space therebetween for receiving a rotating balloon of yarn during twisting, and yarn threading devices including a air injector in said yarn passageway for sucking the yarn from the feed package into said yarn passageway and for ejecting the yarn through and out of said yarn passageway and up through said space between said feed package pot and said balloon limiter; the improvement of:

a pneumatic yarn catching device for grasping and advancing the ejected yarn and including a ring member posi-

tioned in a region above said space between said feed package pot and said balloon limiter and having a closed annular channel in the interior thereof and a cross section open toward said space between said feed package pot and said balloon limiter, and a connecting pipe adapted to be connected to an air source of suction and extending radially from said ring member for creating a suction air flow in said annular channel.

4,998,406

SILVER CAN TRANSPORT CARRIAGE

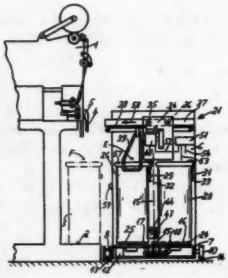
Hans Raasch, Monchen-Gladbach, Fed. Rep. of Germany, assignor to W. Schlafhorst & Co., Fed. Rep. of Germany

Filed Aug. 30, 1989, Ser. No. 400,690

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1988, 3831638

Int. Cl.[5] D01H *9/10, 5/28;* D04H *11/00*

U.S. Cl. 57—281 4 Claims



1. Apparatus for supplying plural spinning stations of an automatic spinning machine with full cans of sliver, comprising a can transporting carriage, movable to travel along the automatic spinning machine between its spinning stations, said carriage having a rotating table defining a plurality of can parking positions at equal radial spacings from the rotational axis of the table for supporting full cans of sliver at the parking positions, and can manipulating means having a can transfer position associated with one of the parking positions for moving a can of sliver from the one parking position to the automatic spinning machine, the can manipulating means including means for rotatably indexing the table by one parking position for individually positioning each parking position in sequence at the can transfer position of the can manipulating means.

4,998,407

METHOD AND APPARATUS FOR PRODUCING YARN

Isamu Matsui; Masao Uehara, both of Kyoto; Shoji Sakai, Nagaokakyo; Koshi Noda, Joyo, and Yasuhiko Kubota, Kyoto, all of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Jul. 11, 1989, Ser. No. 378,148

Claims priority, application Japan, Jul. 11, 1988, 63-172162

Int. Cl.[5] D01H *09/18*

U.S. Cl. 57—328 11 Claims

4. Apparatus for producing a yarn comprising:

a spinning device for drafting and twisting a sliver to form a spun yarn and for taking-up at least two spun yarns in a paralleled state into the same package;

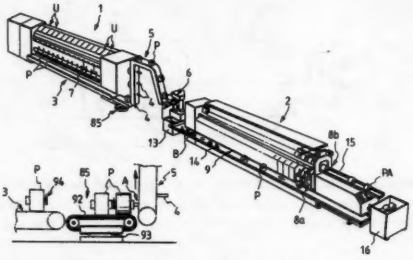
a two-for-one twister;

a conveyor for feeding the packages delivered from the spinning device;

a yarn supply package replacing device for supplying packages to the two-for-one twister;

a gate conveyor disposed between the conveyor and the yarn supply package replacing device; and

a transfer device disposed between the conveyor for feeding the packages and the gate conveyor, the transfer device comprising a belt conveyor and a swiveling driver for driving the conveyor to swivel about a vertical axis to



reverse the direction of the package thereon substantially 180°.

4,998,408

APPARATUS FOR GENERATING ELECTRICAL AND/OR MECHANICAL ENERGY FROM AT LEAST A LOW GRADE FUEL

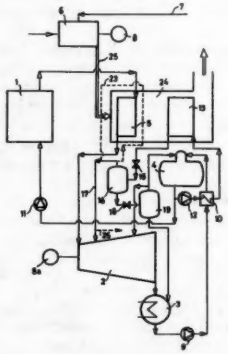
Theodorus Wiekmeijer, Doetinchem, Netherlands, assignor to Prometheus Energy Systems, B.V., Netherlands

Continuation of Ser. No. 213,788, Jun. 30, 1988, abandoned. This application Jul. 27, 1990, Ser. No. 561,236

Claims priority, application Netherlands, Jul. 3, 1987, 8701573

Int. Cl.[5] F02C *6/18*

U.S. Cl. 60—39.182 18 Claims



1. An apparatus for generating electrical and/or mechanical energy from low-grade fuel, the apparatus comprising:

a steam boiler for generating steam, the steam boiling including (1) a heat exchanger, (2) means for generating hot gases by burning the low-grade fuel, the hot gases generated by burning the low grade fuel including a component which is corrosive to the heat exchanger at a first temperature and (3) means for supplying the hot gases to the heat exchanger at a second temperature which is less than the first temperature, such that the heat exchanger is not corroded by the hot gases;

a superheater connected with the boiler for superheating the steam which is generated by the steam boiler;

a steam turbine for using the steam which is superheated by the superheater to generate the electrical and/or mechanical energy; and

second means for (1) generating hot gases by burning high grade fuel all of which is supplied from outside of the apparatus, (2) for supplying the hot gases generated by

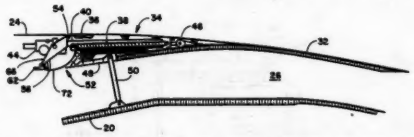
burning the high grade fuel to the superheater at a third temperature which is greater than the first temperature and (3) for leading the hot gases generated by burning the high grade fuel through the superheater to superheat the steam which is generated by the steam boiler.

4,998,409

THRUST REVERSER TORQUE RING

Henry Mutch, Chula Vista, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Filed Sep. 25, 1989, Ser. No. 411,992
Int. Cl.[5] F02K 1/72
U.S. Cl. 60—226.2 **4 Claims**



1. In a thrust reverser system for a gas turbine engine of the type having a core engine with a tubular outer nacelle surrounding said core engine to define an annular bypass duct therebetween, with a fan disposed in the nacelle inlet for directing compressed air flow into said bypass duct;

wherein said thrust reverser system is incorporated into said nacelle aft of said fan and comprises at least one opening through said nacelle, said opening containing a turning vane cascade; an outer door movable between positions covering and uncovering said opening; actuator means for moving said door between said open and closed positions and at least one blocker door aft of said opening and movable between an open position and a closed position obstructing bypass duct flow, the improvement comprising:

a bulkhead ring supporting the forward end of each said turning vane cascade;

a frustoconical ring secured to said bulkhead along the base of said frustoconical ring and mounting an inwardly directed torque ring V-blade along the frustoconical ring apex;

an engine ring secured to primary engine structure adjacent to said nacelle and having an outwardly directed groove adapted to receive said V-blade; and

a curved ramp ring secured to said frustoconical ring at the inner edges of said bulkhead and said torque ring to smooth air flow from said bypass duct to said turning vane cascade;

whereby load paths from said turning vane cascade and actuator means to said primary engine structure are simplified and loads are uniformly transmitted.

4,998,410

HYBRID STAGED COMBUSTION-EXPANDER TOPPING CYCLE ENGINE

Aurelio Martinez-Leon, Camarillo; Christopher M. Erickson, Thousand Oaks, and Pei-Shiun Chen, No. Hollywood, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 5, 1989, Ser. No. 403,278
Int. Cl.[5] F02K 9/46
U.S. Cl. 60—259 **12 Claims**

1. A hybrid staged combustion-expander topping cycle engine which comprises

a fuel turbine,

a fuel pump for pressurizing fuel driven by said fuel turbine,

an oxidizer turbine,

an oxidizer pump for pressurizing oxidizer driven by said oxidizer turbine,

a combustor and associated thrust chamber and expansion nozzle,

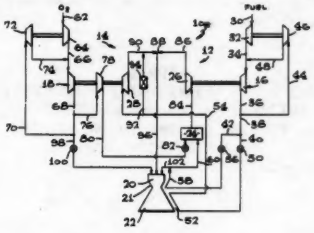
means for passing a portion of the pressurized fuel from said fuel pump in heat exchange relation with said nozzle for cooling same,

means for passing the resulting heated pressurized fuel to the inlet of said oxidizer turbine for driving same,

a preburner,

means for passing a portion of the pressurized oxidizer from said oxidizer pump to the inlet of said preburner,

means for passing another portion of the pressurized fuel from said fuel pump into heat exchange relation with said combustor and said thrust chamber, for cooling same, and then to the inlet of said preburner for combustion therein by said oxidizer,



means for passing the hot combustion gasses discharged from said preburner to the inlet of said fuel turbine for driving same,

means for passing another portion of the pressurized oxidizer from said oxidizer pump to said combustor, and

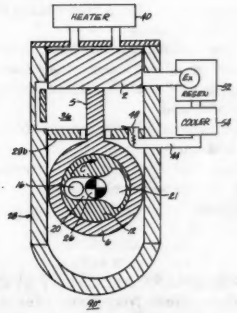
means for passing a portion of said another portion of the pressurized fuel following heat exchange with said combustor and said thrust chamber, to said combustor, for combustion therein by said oxidizer and for passage of the resulting combustion gasses through said thrust chamber and said expansion nozzle.

4,998,411

EXTERNAL COMBUSTION ENGINE WITH IMPROVED PISTON AND CRANKSHAFT LINKAGE

Frank Lopez, 302 Sierra Woods Dr., Sierra Madre, Calif. 91024

Filed Dec. 29, 1989, Ser. No. 458,609
Int. Cl.[5] F02G 1/053
U.S. Cl. 60—517 **18 Claims**



4. In an external heat engine having a piston mounted for movement between a first position and a second position, means for forcibly moving the piston from the first position to the second position (power stroke), a crankshaft rotatable about a main axis, and means for linking the piston and crankshaft so that linear movement of the piston from the first position to the second position during the power stroke is transformed into rotational movement of the crankshaft, the power

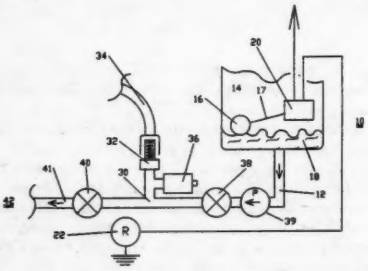
stroke corresponding to a first portion of one rotation of the crankshaft about the main axis, the piston moving from the second position to the first position during a second portion of one rotation of the crankshaft (compression stroke), the improvement wherein the means for linking the piston and crankshaft comprises a rotatable member, means connected to the piston for rotatably supporting the rotatable member, the rotatable member being rotatable about a first point and being connected to the crankshaft at a second point offset from the first point, for rotation about the first point in response to rotation of the crankshaft about its main axis, the first point being disposed so that when the piston is in the first position, the first point is substantially aligned with the main axis of the crankshaft during a third portion of one rotation of the crankshaft about the main axis.

4,998,412

BLOCKAGE ALERT AND PURGE SYSTEM

Joel Bell, 607 Maple Dr., Margate, Fla. 33063

Filed Jan. 22, 1990, Ser. No. 467,395
Int. Cl.[5] F25B *49/00*
U.S. Cl. 62—126 **10 Claims**



1. A sediment and alert purging unit for a condensate removal line of a refrigeration system, the alert purging unit comprising:

(a) means for monitoring the level of condensate within the condensate removal pan or line refrigeration system;

(b) switch means in electrical communication with said monitoring means, for disabling at least a compressor or air handler of said refrigeration system responsive to an unacceptable level of condensate in said removal line;

(c) annunciation means in electrical communication with said switch means, to alert a user when a disabling of said compressor has occurred;

(d) a purge port disposed within said condensate removal line downstream of said monitoring means;

(e) a first condensate line closure valve disposed upstream of said purge port; and

(f) a second condensate line closure valve diposed downstream of said purge port,

whereby pressurized fluid may be introduced within said purge port while a selectable one of said closure valves is closed to permit the purging of the condensate line of any blockage therein.

4,998,413

REFRIGERANT RECOVERY SYSTEM

Hideaki Sato, Oobu; Hisao Nagashima; Kenichi Fujiwara, both of Kariya, and Keiichi Kitamura, Handa, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

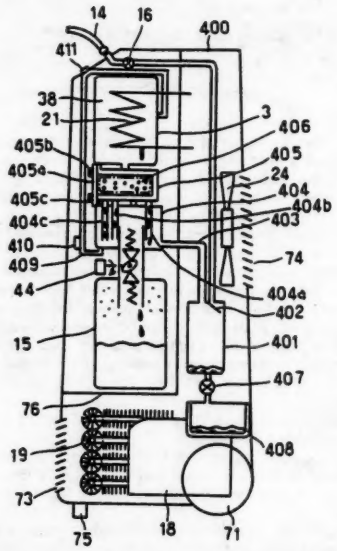
Filed Aug. 31, 1989, Ser. No. 400,548
Claims priority, application Japan, Sep. 1, 1988, 63-216390; Mar. 22, 1989, 1-69944; Jul. 14, 1989, 1-183505
Int. Cl.[5] F25B *45/00*
U.S. Cl. 62—149 **8 Claims**

1. A refrigerant recovery system for recovering a refrigerant from a refrigeration circuit comprising:

a refrigerant recovery vessel connected to the refrigerant passage of said circuit so that gaseous refrigerant is introduced from said circuit into said vessel;

cooling means for cooling said gaseous refrigerant in said vessel so that said refrigerant is liquefied;

a recovery tank which is connected to said vessel and to receive said liquefied refrigerant for evaporating said liquefied refrigerant depending on a difference between an inside temperature of said tank and a temperature of said liquefied refrigerant and for returning said evaporated refrigerant into said vessel and transfer of said liquefied refrigerant from said vessel to said tank again are repeated to lower the inside temperature of said tank for accumulating said liquefied refrigerant;



a moisture exchanging chamber which receives the gaseous refrigerant from the refrigeration circuit and has pipes through which the gaseous refrigerant from said circuit flows toward the refrigerant recovery vessel and the liquefied refrigerant in said refrigerant recovery vessel flows to the moisture exchanging chamber whereby said gaseous refrigerant and said liquefied refrigerant come into direct contact with each other in said pipes to transfer the moisture in said liquefied refrigerant into said gaseous refrigerant; and

attach/detach means for attaching and detaching said tank to and from said vessel so that said tank communicates with said vessel, when said tank is attached thereto.

4,998,414

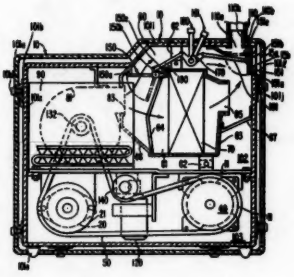
AIR CONDITIONING SYSTEM

Shigenao Tomimatsu, Takasaki, Japan, assignor to Sanden Corporation, Gunma, Japan

Continuation of Ser. No. 219,226, Jul. 15, 1988, abandoned. This application May 24, 1989, Ser. No. 357,630
Claims priority, application Japan, Jul. 15, 1987, 62-108661[U]
Int. Cl.[5] F25D *23/08*
U.S. Cl. 62—259.3 **23 Claims**

1. In an air conditioning system including a compressor, a condenser, an evaporator, a first fan for the condenser, and a second fan for the evaporator, an improvement comprising:

a case enclosing at least said compressor, said condenser, said evaporator, said first fan, and said second fan, said case including an inner housing for containing said compressor, said condenser, said evaporator, said first fan, and



said second fan and an outer housing for enclosing said inner housing, said outer housing fixed to said inner housing and comprising an electrically insulating material.

4,998,415

BODY COOLING APPARATUS

John D. Larsen, 24303 Woolsey Canyon Rd., #135, Canoga Park, Calif. 91304

Filed Oct. 30, 1989, Ser. No. 428,914

Int. Cl.[5] F25D *23/12*

U.S. Cl. 62—231 **11 Claims**

9. Body cooling apparatus for removing body or external heat in an environment where sufficient cooling by perspiration is not available, said apparatus comprising:

a pressurized container containing a liquid boiling at temperature of about 38° at atmospheric pressure, said container having a liquid inlet connection and a liquid outlet connection;

a flexible tube connected to the liquid outlet connection of said pressurized container, said flexible tube connected to the inlet of a flexible tube network including an inlet and an outlet, said network being held adjacent a body to be cooled, thereby heating the liquid and causing it to boil to cool the body and to vaporize the liquid into a gas;

a gas compressor for compressing said gas, said gas compressor including gas inlet and outlet lines, said inlet of said compressor being connected to said outlet of said network;

a condenser having a gas inlet and a liquid outlet line, said gas inlet of said condenser being connected to the gas outlet line of said compressor and the liquid outlet line of said condenser being connected to the liquid inlet of said pressurized container, said pressurized container, said gas compressor and said condenser being held in a frame; and

control valve means in said flexible tube connected to said liquid outlet connection of said pressurized container to control the flow of liquid into said network and to control the amount of cooling possible from said network, said control valve means including timing means to cycle the flow of liquid between an on and an off position, and the amount at time the valve is on and the amount of time the valve is off being controlled by a clock have an external adjustment control.

4,998,416

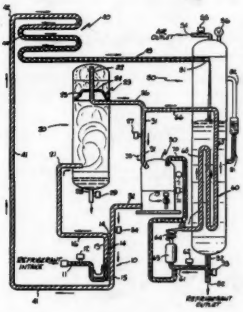
REFRIGERANT RECLAIM METHOD AND APPARATUS

Leon R. Van Steenburgh, Jr., 850 East La., Estes Park, Colo. 80515

Continuation-in-part of Ser. No. 109,958, Oct. 19, 1987. This application Oct. 14, 1988, Ser. No. 258,166

Int. Cl.[5] F25B *45/00*

U.S. Cl. 62—292 **10 Claims**



1. In an apparatus for reclaiming refrigerant comprising, in combination, means for removing gaseous or liquid refrigerant from a container, vaporizing all of said liquid refrigerant and separating oil from the gaseous refrigerant, a compressor for receiving and compressing said gaseous refrigerant from said container, a condenser for receiving and condensing said gaseous refrigerant from said compressor, and means for receiving and storing said liquid refrigerant from said condenser, the improvement of liquid injection means in fluid communication with said compressor, whereby said liquid injection means inject controlled amounts of liquid refrigerant into said compressor in order to prevent overheating of the compressor.

4,998,417

ICEMAKER SYSTEM WITH WIDE RANGE CONDENSING TEMPERATURES

John D. Ruff, Alexandria, Va., assignor to Thermadyne, Inc., Alexandria, Va.

Continuation-in-part of Ser. No. 437,161, Nov. 16, 1989, Pat. No. 4,941,902, which is a division of Ser. No. 278,447, Dec. 1, 1988, Pat. No. 4,897,099. This application Mar. 16, 1990, Ser. No. 494,546

Int. Cl.[5] C02F *1/22*

U.S. Cl. 62—532 **17 Claims**

1. In a refrigeration system wherein refrigerant fluid flows through a closed flow path having a compressor, condenser means, evaporator means and metering means for delivering the refrigerant fluid to said evaporator means from said condenser means, and wherein said condenser means comprises at least first and second alternatively active condensers, said first condenser operating at relatively high condensing temperatures and pressures, said second condenser operating at rela-

tively low condensing temperatures and pressures, apparatus for compensating for the different condensing pressures so as not to significantly change the refrigerant fluid flow rate to said evaporator means, said apparatus comprising:

first means responsive to actuation of said first condenser for providing a relatively small metering orifice at said metering means; and

second means responsive to said second condenser becoming active for providing a relatively large metering orifice at said metering means;

wherein said metering means comprises a thermostatic expansion valve comprising:

a valve body;

a power diaphragm defining actuation chambers in said valve body;

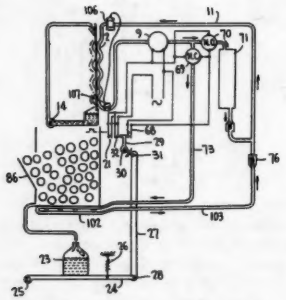
a fluid inlet opening;

a fluid outlet opening;

a fluid passage including said metering orifice interconnecting said fluid inlet and outlet opening;

control means responsive to the pressures in said actuation chambers for varying the size of said metering orifice, said control means including an actuator mechanically linked to said power diaphragm, the position of said actuator determining the size of said metering orifice; and

damping means for slowing the rate of movement of said actuator to prevent sudden changes in the size of said metering orifice;



wherein said damping means comprises:

a damping diaphragm secured to said actuator and disposed in said valve body to define a damping chamber, said damping diaphragm being secured to and movable with said actuator;

damping liquid filling said damping chamber to resist movement of said damping diaphragm; and

a leakage passage responsive to pressurization of said damping liquid in said chamber by said damping diaphragm for permitting some of said damping liquid to be forced from said damping chamber to thereby permit corresponding movement of said damping diaphragm;

and further comprising:

a second damping diaphragm secured to said actuator and disposed in said valve body to define a further chamber, said second damping diaphragm being secured to and movable with said actuator;

a common wall of said valve body disposed between said first and second damping diaphragms to partially define said first and second damping chambers, said common wall having an aperture defined therethrough;

wherein said actuator is a rod movably extending through said aperture in said common wall and secured to each of said first and second damping diaphragms;

wherein said second damping chamber is filled with said damping liquid; and

wherein said leakage passage extends between said first and second damping chambers.

4,998,418

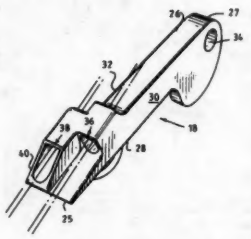
FEED FINGER FOR KNITTING MACHINES

Charles Fatigati, East Meadow, N.Y., assignor to Knittex Fashions, Inc., Ridgewood, N.Y.

Continuation of Ser. No. 229,701, Aug. 8, 1988, abandoned. This application Feb. 20, 1990, Ser. No. 483,325

Int. Cl.[5] D04B *9/34, 15/54, 9/10*

U.S. Cl. 66—14 **2 Claims**



1. An improved feed finger for use on circular Links and Links knitting apparatus provided with a plurality of needles and a plurality of feed fingers pivotal into and out of active knitting position with respect to said needles to manufacture plaited fabric, said improved feed finger comprising a generally elongated shaped flat body portion having means at its rear end for pivotal attachment to the frame of said knitting apparatus, a flat upper surface, a pair of elongated passages, each having a bottom coplanar with the upper surface of the finger, said passages extending along the flat body portion toward the forward end of said finger in a side-by-side parallel disposition and slightly offset from each other axially one to the rear of the other, said passages directing the respective yarns at substantially the same level and angle of approach to a single one of said needles to produce a plaited knit fabric in which at least one yarn is visible on one side of said fabric, and another yarn is visible on the other side of said fabric.

4,998,419

PROCESS FOR KNITTING LOOP PILE

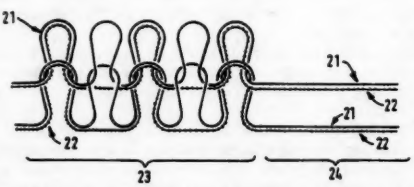
Rosemary V. A. Moore, 28A Manchester Street, London W1M 5PF, England

Continuation of Ser. No. 144,916, Feb. 19, 1988, abandoned. This application Jan. 26, 1989, Ser. No. 303,041

Claims priority, application United Kingdom, May 9, 1986, 8611412

Int. Cl.[5] D04B *9/06, 1/02*

U.S. Cl. 66—25 **13 Claims**



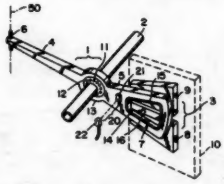
1. A process for knitting a fabric on a knitting machine having a first set of needles and a second set of needles, wherein a non-contractible yarn is knitted on said first and second sets of needles and a contractible yarn is knitted on said second set of needles only, such that, in each course, said yarns are knitted for at least one stitch and float together over a plurality of missed stitches, a pattern of knitting and floating repeating along said course of the fabric, so that, when said contractible yarn is contracted, said non-contractible yarn forms raised loops upon one face of the fabric.

4,998,420

LEVER-TYPE YARN GUIDE DEVICE OPERATED BY A LINEAR MOTOR, FOR TEXTILE MACHINES

Mario Scavino, via Alla Cava 5, 20050 Lesmo MI, Italy

Filed Jun. 7, 1989, Ser. No. 363,618
Claims priority, application Italy, Jun. 20, 1988, 21045 A/88
Int. Cl.[5] D04B *15/58*
U.S. Cl. 66—138 18 Claims



1. A lever-type yarn guide device for textile machines, in particular machines for hosiery and knitwork, comprising:

at least one yarn guide lever free to move between and beyond first and second predetermined positions;

a linear motor including electromagnetic means for moving said guide lever to any position in a range between and including said predetermined positions; and

position detecting means for detecting any position assumed by said lever during its movement at least within said range.

4,998,421

PROCESS FOR ELASTIC STITCHBONDED FABRIC

Dimitri P. Zafiroglu, Greenville, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 28, 1990, Ser. No. 545,047
Int. Cl.[5] D04B *23/08*
U.S. Cl. 66—192 6 Claims

1. An improved process for preparing an elastic stitchbonded fabric which comprises the steps of feeding to a stitchbonding operation a nonbonded or lightly bonded fibrous layer weighing in the range of 15 to 150 g/m^2, multi-needle stitching the layer with elastic thread that forms spaced-apart, parallel rows of stitches, the needle spacing being in the range of 0.5 to 10 needles per centimeter and the stitches within each row being inserted at a spacing in the range the range of 1 to 7 stitches per cm, and removing the fabric from the stitchbonding operation, the improvement comprising feeding the elastic yarns to the stitching needles with a residual stretch of at least 100%.

4,998,422

REMOVABLE CORE PADLOCK WITH BOLT RETAINER

James W. Borgmann, Carmel, and William R. Foshee, deceased, late of Indianapolis, both of Ind. (by Carolyn S. Foshee, executrix), assignors to Best Lock Corporation, Indianapolis, Ind.

Filed Aug. 30, 1989, Ser. No. 400,817
Int. Cl.[5] E05B *67/22*
U.S. Cl. 70—38 A 38 Claims

1. A removable core padlock comprising

a lock case formed to include a lock cavity configured to receive a removable core and a bolt-receiving cavity in communication with the lock cavity,

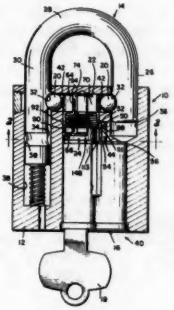
a shackle movable between locked and open positions relative to the lock case,

means in the lock case for locking the shackle in its locked position, the locking means being movable between a shackle-locking position and shackle-releasing positions,

bolt means in the bolt-receiving cavity for moving the locking means from its shackle-locking position to a shackle-releasing position in response to operation of a removable core in the lock cavity,

first spring means for yieldably urging the bolt means relative to the lock case to a position establishing the shackle-locking position of the locking means, and

second spring means for yieldably urging a portion of the bolt means relative to the lock case into removal-blocking



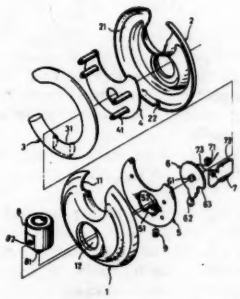
engagement with an inner wall of the lock case so that the bolt means is retained in the bolt-receiving cavity in a substantially immobile position while the lock cavity is empty of a removable core.

4,998,423

RING SHAPED HANGING LOCK WITH REPLACEABLE CORE

Fong S. Hsu, 6th Fl., No. 20, Alley 7, Ln. 35, Jen Ai Rd., Sec. 4, Taipei, Taiwan

Filed Jan. 5, 1990, Ser. No. 461,369
Int. Cl.[5] E05B *67/28*
U.S. Cl. 70—40 15 Claims



1. A ring-shaped hanging lock, comprising:

a casing with an open portion, a first opening and a second opening;

a ring-shaped shackle with an open portion, the shackle being located within the casing, the shackle being slidable within the casing between an open position, an intermediate position and a closed position, the open portion of the shackle being aligned with the open portion of the casing when the shackle is in the open position, the open portion of the casing being closed by the shackle when the shackle is in the intermediate and closed positions, the second opening of the casing being obstructed by the shackle such that a tool cannot be inserted into the casing through the second opening when the shackle is in the open and closed positions;

a latch which is movable between a locked position and an unlocked position, the latch being located within the casing, the latch being in the locked position and engaged with the shackle so as to prevent the shackle from moving

to the intermediate position when the shackle is in the closed position, the latch being disengaged from the shackle when the latch is in the unlocked position;

a control cam for moving the latch from the locked position to the unlocked position and for moving the shackle, the control cam being located within the casing;

a replaceable core for operating the control cam, the core being located within the casing; and

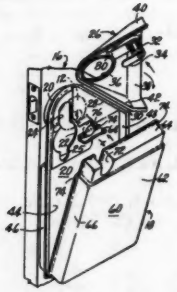
securing means for securing the core within the casing, the securing means being aligned with the second opening of the casing such that the securing means can be operated upon by the tool to permit removal of the core from the casing through the first opening when the shackle is in the intermediate position.

4,998,424

DOOR ATTACHABLE SAFE

Vincent Lambert, II, 224 Jewett St., Providence, R.I. 02908

Filed Dec. 7, 1989, Ser. No. 447,379
Int. Cl.[5] E05B *65/52*
U.S. Cl. 70—63 **13 Claims**



1. A safe for providing a secure enclosure for products contained therein and for the temporary attachment of that enclosure to a doorknob on a door, said safe comprising:

a housing for containnment of products therein:

an extended portion of said housing for sliding engagement with a doorknob;

a lock on a lockable cover portion to mate with both said extended portion and said housing to secure both to a doorknob;

said housing comprising a back panel and a front panel hingedly disposed together, said back panel having a backside and further including said extended portion;

said lockable cover portion having an opening which engages a doorknob disposed through said extended portion, to prevent movement of a safe therefrom.

4,998,425

TOOL BOX SECURING ARRANGEMENT

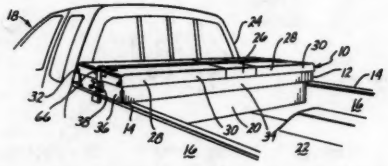
William Hoogland, 8220 Eucalyptic Dr., Bakersfield, Calif. 93306

Filed May 16, 1990, Ser. No. 524,153
Int. Cl.[5] B65D *55/14*
U.S. Cl. 70—159 **2 Claims**

1. Means for securing a tool carrier disposed transversely behind the cab of a pick-up truck and above its carrier bed, said tool carrier comprising an extended rectangular box having a bottom, a pair of end walls and a pair of side walls and a center top section permanently secured transversely of the box to the upper areas of both side walls, and a pair of closure doors, each having one end hinged on the top section to pivot between a first position where the door's end opposite the hinged end rests on the top of an end wall for securing thereto, and a second position pivoted upwardly from the end wall to permit access to the inside of at least a portion of the tool carrier box, said securing means comprising:

a staple, said staple comprising a flat base plate bolted centrally to the outside of the upper edge of each end wall by fasteners removable only from the inside of the end walls, and a link extending normally upwardly from said base plate;

steel strap means, said strap means extending from below the staple link on one end wall to below the link on the other end wall and contoured to abut the said top section and



both closure doors when they are in their first position, each end of said steel strap means being slotted to fit over the staple link on one of the two end walls and to leave an opening in the staple link through which the link of a padlock may be passed; and

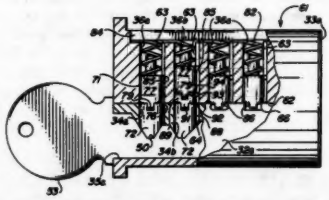
a plurality of removable padlock means each having a link for insertion through each staple link, after the end of the steel strap means has been brought over an end wall and the staple link has been passed through the slot, said padlock thereupon being locked against opening by other than its specific unlocking means.

4,998,426

CYLINDER LOCK

Joseph M. Genakis, 948 W. Boylston St., Worcester, Mass. 01606

Division of Ser. No. 59,307, Jun. 8, 1987, Pat. No. 4,932,229.
This application Feb. 6, 1990, Ser. No. 475,538
Int. Cl.[5] E05B *27/04*
U.S. Cl. 70—494 **15 Claims**



1. In a lock having a cylindrical shell, a plug rotatable relative to said shell along a shear line between locked and unlocked positions, said shell and said plug having holes therein coaxially aligned in said locked position to define a plurality of tumblerways, a tumbler assembly disposed in each of said tumblerways and being separable along at least one split line, axial bias means normally biasing each of said tumbler assemblies in an axial direction to a position wherein a said split line is not in alignment with said shear line thereby preventing relative rotation of said plug from said locked position, and means defining a keyway for receiving a proper key to move each of said tumbler assemblies axially in opposition to said axial bias means and to a position wherein a said split line thereof is generally aligned with said shear line to permit said plug to be rotated from its locked to its unlocked position, the improvement comprising:

at least one of said tumbler assemblies comprising a pin tumbler supported for rotational movement about its axis within one of said tumblerways, a driver, coupling means

releasably coupling said driver to said pin tumbler for rotational movement of said driver about its axis in response to said rotational movement of said pin tumbler, said coupling means at least partially defining said split line along which said pin tumbler and said driver may separate when said one tumbler assembly is axially and rotationally potitioned relative to said plug and said shell in a predetermined releasing position wherein said split line is aligned with said shear line, and means on said pin tumbler for positioning said one pin tumbler assembly in said releasing position in response to engagement with a proper key in said keyway;

cavity means defined by said plug and arranged to receive a portion of said coupling means during relative movement of said plug out of said locked position; and

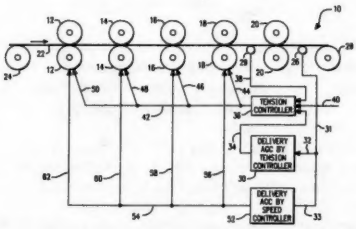
driver limit means for limiting rotational movement of said driver in said one tumblerway, said limit means comprising an engagement surface means defined by said shell, and a stop surface means defined by said driver and engageable with said engagement surface means in response to a predetermined limited extend of axial rotation of said driver in said one tumblerway.

4,998,427

METHOD FOR ROLLING ON-GAUGE HEAD AND TAIL ENDS OF A WORKPIECE

Robert S. Peterson, Indiana Township, Allegheny Country, Pa., and John A. Larsen, Phoenix, Ariz., assignors to AEG Westinghouse Industrial Automation Corporation, Somerville, N.J.

Filed Nov. 29, 1989, Ser. No. 443,697
Int. Cl.[5] B21B *37/06*
U.S. Cl. 72—9 **14 Claims**



10. A method for rolling on gauge material in the head end and the tail end of a ferrous or non-ferrous workpiece such as travelling through several stands of a tandem cold mill, each stand having two work rolls defining a roll gap, the steps comprising:

in the threading phase of said mill,

employing a tension by speed mode for the interstand tension regulators, and using a tension controller between the last two stands of the mill to receive input from a tension measuring device representative of the actual tension in said workpiece between said two last stands,

providing a desired tension input to said tension controller,

measuring the delivery gauge thickness of said workpiece at the exit end of the last stand of said mill by a delivery gauge sensor and producing a delivery gauge error signal,

energizing and operating only a delivery automatic gauge control by tension controller which is activated by said delivery gauge error signal and generating and sending an output from said automatic gauge control by tension controller to said tension controller between said last two stands, while allowing a delivery automatic gauge control by speed controller to remain deactivated,

in said tension controller between said last two stands comparing said actual tension in said workpiece between said last two stands to said desired tension input and summing the tension difference with said output from said delivery automatic gauge control by tension controller to produce a tension error output, and

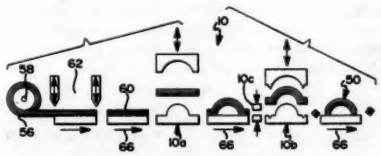
sending this tension error signal to only each of the downstream stands relative to the last stand to change the speed of only each of the downstream stands relative to said last stand at the same rate by using said tension error output as a stand speed reference to vary the interstand tension in the workpiece to effect a gauge correction to obtain said on gauge material in said head end of said workpiece, and at the same time causing said tension controller to send no tension error signal to said last stand.

4,998,428

METHOD OF CLEANING STAMPING DIES

William S. Rechenbach, Traverse City, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 17, 1989, Ser. No. 395,400
Int. Cl.[5] B21D *22/00;* **B21C** *43/00, 35/06*
U.S. Cl. 72—40 **3 Claims**



1. A method for cleaning dies in a stamping press the press having first and second relatively moving dies and a press ram for closing the dies and opening the dies to permit removal of slivers and fine particles of material removed from processed sheet material during the stamping operation characterized by the steps of periodically interposing a sheet of material between said relatively moving dies to completely cover the working surfaces of said dies;

preconditioning the sheet of material by providing a layer of adhesive material thereon to attract and trap accumulated waste particles generated by the stamping process from the dies and tooling components of the stamping press as it covers the working surfaces of the dies;

positioning the press ram to close the dies into proximity with the sheet of material to cause accumulated waste particles thereon to be removed from the dies and tooling and deposited on the sheet of material; and

thereafter removing the sheet of material and deposited waste particles thereon from the die press apparatus.

4,998,429

METHOD FOR DRAWING TUBULAR MATERIAL

Yukio Yamanoi; Mitsuo Kandachi; Masahiro Iwata, and Kazumi Kato, all of Oyama, Japan, assignors to Furukawa Aluminum Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 319,989, Mar. 6, 1989, abandoned, which is a division of Ser. No. 184,368, Apr. 21, 1988, Pat. No. 4,860,568. This application Apr. 9, 1990, Ser. No. 506,578
Claims priority, application Japan, Jul. 27, 1987, 62-187443; Jul. 27, 1987, 62-187444
Int. Cl.[5] B21C *1/22*
U.S. Cl. 72—283 **8 Claims**

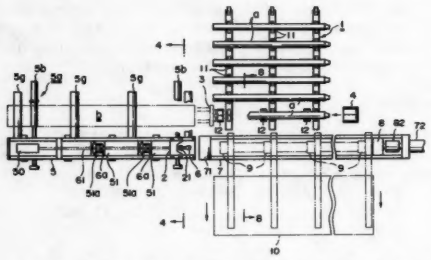
1. A method for manufacturing precision tubes comprising the steps of:

holding a plug rod horizontally at a rear end portion and at an intermediate portion thereof;

holding the rear end portion of a tube element, moving the tube element in a horizontal direction over the plug rod while the rear end portion of the plug rod is held horizontally, and releasing the intermediate portion of the plug rod when the tube element passes the intermediate portion, so that the plug rod is coaxially inserted into the tube element;

holding the rear end portion of the tube element in which the plug rod is inserted, and moving the tube element so that it is arranged to be coaxial with a die; and

moving the front end portion of the tube element forward and horizontally to allow said die to draw the precision tube element;



wherein the step of holding the rear end portion of the tube element comprises holding the inner peripheral surface of the tube element with holding means by having a through hole through which the plug rod passes.

4,998,430

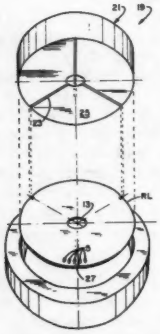
MANUFACTURE OF ROTOR LAMINATION FOR A DYNAMOELECTRIC MACHINE

Conrad L. Howe, Paragould, Ark., assignor to Emerson Electric Co., St. Louis, Mo.

Division of Ser. No. 402,558, Sep. 5, 1989, abandoned. This application Jun. 7, 1990, Ser. No. 534,333

Int. Cl.[5] B21D *28/00*

U.S. Cl. 72—335 **2 Claims**



1. In a punch press for manufacturing stator and rotor laminations for a dynamoelectric machine from a strip of material fed into the press, the press including a die having a series of work stations for forming the respective laminations including one work station at which a punch strikes the strip of material to form a rotor lamination, the rotor lamination having a series of slots formed around the circumference thereof at a prior work station, the improvement comprising a punch having a generally horizontally extending bottom cutting face provided with a plurality of radial grooves spaced about the punch and extending outwardly to an outer cutting edge thereof whereby when the punch strikes the material to form a rotor lamination the material beneath the grooves forms in an upper face of said rotor lamination raised peripherally spaced areas extending to an outer margin of said rotor lamination which are not severed from the remainder of the strip at the outer margin thereof so as to maintain the rotor lamination attached to the strip, the radial grooves being so spaced about the punch that the raised peripherally spaced areas lie between adjacent slots of said rotor lamination; punch means at a succeeding work station for punching out the rotor lamination from the strip of material; enclosed receptacle means with an open upper end at said succeeding work station for collecting the rotor lamination in stacked relationship within said enclosed receptacle means; and means for at least partially rotating the enclosed receptacle means between each operation of the punch means so as to re-position the raised peripherally spaced areas of adjacent stacked rotor laminations in non-aligned relationship to one another and produce a stack of rotor laminations having a uniform thickness in said enclosed receptacle means.

4,998,431

FIELD USABLE CALIBRATOR FOR HUMIDITY METERS

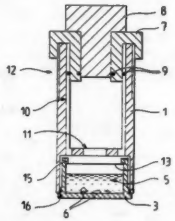
Kalervo A. Jäppinen, Helsinki; Marja-Riitta Hakala; Jouko S. Jalava, both of Vantaa, and Ari Lehto, Helsinki, all of Finland, assignors to Vaisala OX, Helsinki, Finland

Filed Sep. 27, 1989, Ser. No. 413,199

Claims priority, application Finland, Oct. 27, 1988, 884967

Int. Cl.[5] G01D *18/00*

U.S. Cl. 73—1 G **7 Claims**



1. A field usable humidity meter calibrator apparatus based on the use of a saturated salt solution, comprising;

a hollow base part, which forms a compartment for saturated water vapor and sealable from an upper end with an adapter plug assembly;

a replaceable humidity calibrator cartridge, which has an inner space containing a liquid and is attachable to a hole provided at a lower end of the base part of the apparatus; and

a semipermeable membrane, which seals a part of the humidity calibrator cartridge entering the base part of the apparatus and provides a separation of the compartment in the base part of the apparatus and liquid-containing space of the cartridge, allowing the permeation of water vapor and preventing permeation of the liquid.

4,998,432

APPARATUS AND METHOD FOR MEASURING A GAS CONTENT OF LIQUID METAL AND PROBE USED THEREIN

Jacques J. Plessers, Houthalen, and Rudi Maes, Zonhoven, both of Belgium, assignors to Electro-Nite International N.V., Antwerp, Belgium

PCT No. PCT/EP88/00206, § 371 Date Nov. 17, 1988, § 102(e) Date Nov. 17, 1988, PCT Pub. No. WO88/07197, PCT Pub. Date Sep. 22, 1988

PCT Filed Mar. 16, 1988, Ser. No. 283,998

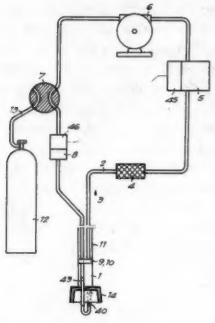
Claims priority, application Belgium, Mar. 18, 1987, 08700279; Feb. 10, 1988, 08800152; Feb. 10, 1988, 08800154

Int. Cl.[5] G01N *7/14, 27/18*

U.S. Cl. 73—19.07 **47 Claims**

1. An apparatus for measuring a gas content of liquid metal, said apparatus comprising a probe for being immersed in the liquid metal, said probe including a gas supply line which debouches at an end of the probe, a gas collection section for

collecting a gas flowing out of the gas supply line, said gas collection section being positioned for receiving the gas flowing from the debouchment of the gas supply line and being provided with a diaphragm permeable for gas but impermeable for liquid metal, a gas removal line in fluid communication with the gas collection section, a gas circuit having a first end in fluid communication with the gas supply line of the probe and a second end in fluid communication with the gas removal line of the probe, at least one gas detector in fluid communication with said circuit, gas moving means in fluid communication with said circuit for moving gas through the circuit, the gas detector and the probe, a lance through which at least a section of the gas circuit extends, and a quick-connection coupling having two parts which can be coupled to each other, said lance containing one part of said quick-connection coupling, said probe containing the other part of the quick-connection coupling, said quick-connection coupling providing in the coupled state, a gastight connection of the gas supply line and the gas removal line to the first and second ends of the gas circuit.



4,998,433

METHOD AND MEANS FOR CONDENSING TRACE AIR CONTAMINATES FROM GASES

David K. Stumpf, 630 LaCholla Blvd., Tucson, Ariz. 85745, and Curt N. Blair, 2302 N. Catalina Ave., Tucson, Ariz. 85712

Filed Jun. 19, 1989, Ser. No. 367,963

Int. Cl.[5] G01N *30/12*

U.S. Cl. 73—25.01 **16 Claims**

1. Apparatus for condensing out trace contaminates from gases, comprising:

a heat sink having thereon a support surface,

at least one thermoelectric element mounted on said heat sink and having thereon a first surface disposed in thermally conductive contact with said support surface on said heat sink,

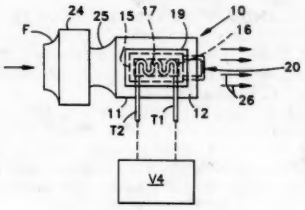
a sample block mounted on said element and having thereon a surface disposed in thermally conductive contact with a second surface formed on said element opposite said first surface thereof,

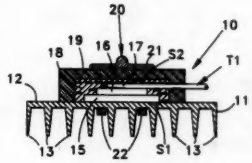
said block having therein a contaminate collecting duct overlying said element and containing a plurality of condensing surfaces,

means for operating said thermoelectric element in a chilling mode to reduce the temperature of said block and said condensing surfaces therein to a predetermined gas condensing temperature,

means for conveying a gas sample in a first direction through said duct while the latter is at said gas condensing temperature, thereby to cause contaminates in said gas sample to be condensed out on said condensing surfaces,

means for operating said thermoelectric element in a heating mode to vaporize contaminates previously condensed out in said duct on said condensing surfaces, and





means for conveying a carrier gas through said duct in a second direction opposite to said first direction, thereby to convey said vaporized contaminates to a gas analytical device or the like.

4,998,434

GAS LEAKAGE DETECTOR

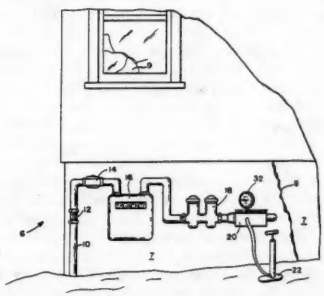
Andrew F. Asbra, 555 Laurel St., #121, San Mateo, Calif. 94401

Continuation-in-part of Ser. No. 321,960, Mar. 10, 1989, Pat. No. 4,895,018. This application Oct. 3, 1989, Ser. No. 416,717

The portion of the term of this patent subsequent to Jan. 23, 2007, has been disclaimed.

Int. Cl.[5] G01M *3/20*

U.S. Cl. 73—40.50 R **11 Claims**



1. A permanent in-line gas leakage detector comprising: a housing having coupling means for enabling the housing to be installed in a gas supply line downstream of a main gas shutoff valve, the coupling means disposed on opposed ends of the housing, the housing having interior structure defining a flow path through the housing, valve means within the housing for cutting off the downstream gas supply line from the source of gas, the valve means having a valve seat with a flow through opening, the valve seat surrounding a valve body with a transverse opening therethrough, a pressure indicator coupling means within the housing and communicating with the flow path, a gas pressure indicator, and an external gas source connecting means for enabling a two way flow of an optional

charging gas from a source thereof to enter the housing and pass into the downstream gas supply line.

4,998,435

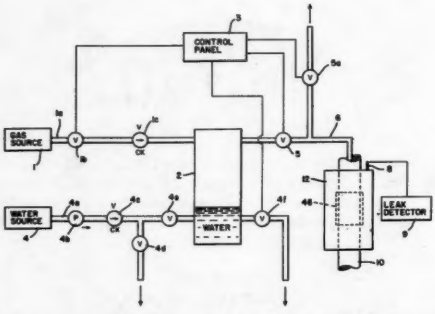
METHOD AND APPARATUS FOR LEAK TESTING OF PIPE

Ronnie F. Miller; Arthur L. Dwyer; Darwin A. Miller, and Darwin L. Miller, all of Houma, La., assignors to Damco Testers, Inc., Houma, La.

Continuation of Ser. No. 148,173, Jan. 22, 1988, abandoned, which is a continuation of Ser. No. 860,027, May 6, 1986, abandoned, which is a continuation of Ser. No. 571,823, Jan. 18, 1984, Pat. No. 4,601,904, which is a continuation-in-part of Ser. No. 458,790, Jan. 18, 1983, abandoned. This application Jan. 13, 1989, Ser. No. 296,859

Int. Cl.[5] G01M *3/20*

U.S. Cl. 73—40.7 **9 Claims**



9. An apparatus for testing for leaks in oil field pipe at a rig floor by using a single source of pressurized test gas to actuate a test tool positioned at a pipe test section and to pressurize the pipe test section to test for leaks, said apparatus comprising:

(a) a test tool comprising a pair of spaced apart cylindrical mandrels each having a reduced diameter piston surface, each of the mandrels having a shoulder formed intermediate its length at the intersection of the reduced diameter piston surface and the full diameter portion, each of the mandrels having a through bore, each of the mandrels having a laterally extending passageway in fluid communication with the through bore of its mandrel, a pair of hub members each associated with one of the mandrels, each of the hub members being secured to one of the mandrels, each of the hub members having a through bore in fluid communication with the through bore of its associated mandrel and an external shoulder positioned radially outwardly of the mandrel, a pair of sleeves each slidably mounted on one of the mandrels adapted to abut against the shoulder of the hub member and define an annular space in communication with the laterally extending passageway, annular sealing rings positioned about the outer periphery of the sleeve, the sealing rings being positioned to abut a shoulder of the sleeve, a plug in one of the hubs having an outlet means therein adapted to be in fluid communication with the through bore of its mandrel, the hub members being secured to opposite ends of a spacer tube located between the mandrels,

(b) means for pressurizing a test gas comprising a mixture of a detectable quantity of helium tracer gas and a carrier gas in a ratio of helium tracer gas to carrier gas greater than 1:9 by volume to a pressure of at least 3000 psi to provide a single source of pressurized test gas;

(c) means for enclosing an area around the outside of the pipe to define a chamber around the pipe test section to confine a test gas therewithin;

(d) means for actuating the test tool by introducing said pressurized test gas having a ratio of helium tracer gas to carrier gas greater than 1:9 by volume and at a pressure of at least 3000 psi from said single source of pressurized test gas into the test tool through the through bores and laterally extending passageways to cause the respective sleeves to move in opposite directions relative to each other toward the respective sealing rings causing compression of the sealing rings between the shoulder on its associated sleeve and the shoulder on its associated mandrel and radially outward expansion thereof into sealing engagement with the interior surface of the pipe to seal off an internal section of pipe to form a closed volume pipe test section;

(e) means for introducing said pressurized test gas from said single source of pressurized test gas at substantially the same ratio of helium tracer gas to carrier gas greater than 1:9 by volume and at substantially the same pressure of at least about 3000 psi as used to actuate said test tool into said pipe test section by permitting the pressurized test gas, once the sealing rings are expanded into engagement with the interior surface of the pipe, to flow through the plug into an annular space defined between the sealing rings of the respective mandrels; and

(f) means for sensing the presence of leaking helium tracer gas in the chamber around the outside of the pipe test section with a sensing means.

4,998,436

BELT SUPPORTING STRUCTURE FOR BENCH TESTING APPARATUS

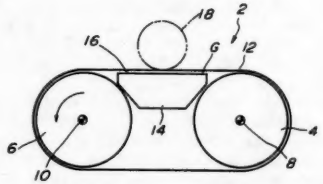
Hideo Kaizu, and Kimihiko Kaneko, both of Tokyo, Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo, Japan

Filed Mar. 8, 1990, Ser. No. 490,317

Claims priority, application Japan, Mar. 9, 1989, 1-57572; Mar. 10, 1989, 1-59278; Mar. 24, 1989, 1-73218; Mar. 24, 1989, 1-73219; Apr. 4, 1989, 1-39669[U]; Apr. 4, 1989, 1-39670[U]; Apr. 5, 1989, 1-40256[U]; Apr. 5, 1989, 1-40257[U]

Int. Cl.[5] G01M *19/00*

U.S. Cl. 73—117 **12 Claims**



1. An endless belt type bench testing apparatus, comprising:

a pair of rotary drums arranged with a predetermined distance therebetween;

a flexible endless belt wound over said rotary drums and extending therebetween, said belt adapted to move in a first direction;

a supporting base disposed between said rotary drums and having an operating surface which faces a portion of said belt with a predetermined clearance gap therebetween;

said operating surface formed with a plurality of first discharge ports which communicate with a liquid medium supply source through first means formed in said supporting base for establishing a hydraulic pressure in a form of a liquid medium layer at said clearance gap;

second means, associated with said liquid medium, for ensuring effective generation of a dynamic pressure in a form of said liquid medium layer at said clearance gap.

4,998,437

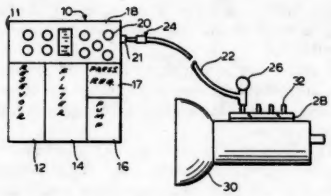
UNIVERSAL METHOD AND APPARATUS FOR TESTING CLUTCHES AND BANDS WITHIN AN AUTOMATIC TRANSMISSION

Jack Magoolaghan, 81 8th Ave., Kings Park, N.Y. 11754

Continuation-in-part of Ser. No. 138,793, Dec. 28, 1987, abandoned. This application Feb. 15, 1990, Ser. No. 481,987

Int. Cl.[5] G01M *15/00*

U.S. Cl. 73—118.1 26 Claims



1. An apparatus for testing bands and clutches of a transmission of a vehicle, said transmission being tested in a static, non-operating condition, said transmission having a plurality of bands and clutches and a removable valve body, said apparatus comprising:

a test station remote from said transmission, said test station including a housing and having a gauge panel for displaying a plurality of gauges;

a fluid pump and pressure regulator for pumping a fluid medium from a reservoir through said test station to said transmission;

a connection member for fluidly connecting said test station to said transmission, said fluid medium flowing through said connection member;

a reducing means for reducing an inner diameter of said connection member intermediate said test station and said transmission;

an in-line pressure gauge positioned in said connection member intermediate said reducing means and said transmission; and

an adaptor plate having means for mounting to said transmission; said plate being mounted to said transmission at a location corresponding to said valve body after said valve body has been removed, said plate being provided with a plurality of plug members for coupling to said connection member.

4,998,438

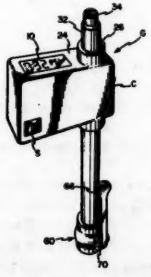
DIGITAL AIR PRESSURE GAUGE AND INFLATION DEVICE

Jerry L. Martin, 6387 Dove St., Norfolk, Va. 23513

Filed May 22, 1990, Ser. No. 526,993

Int. Cl.[5] B60C *23/00*

U.S. Cl. 73—146.8 5 Claims



1. A hand held tire pressure gauge for attachment to a tire valve stem for measuring and displaying the air pressure in a tire, said tire pressure gauge comprising:

(a) casing means having a gripping surface and forming an enclosure for containing air pressure detection means and having means for visibly displaying air pressure in a tire,

(b) said casing having top, bottom, first end, second end, front and back walls, each of said walls being rectangular in shape and together forming said enclosure,

(c) an air chamber is located within said enclosure and extends between said top and bottom walls adjacent said first end wall,

(d) said air chamber having a first opening at said top wall of said casing means, a second opening at said bottom wall of said casing means, a third opening centrally located at said first end wall of said casing means and a fourth opening located within said enclosure formed by said casing means,

(e) air supply hose engagement means connected to and extending from said first opening of said air chamber,

(f) tire valve engagement means connected to and extending from said second opening of said air chamber so that direct air communication is obtained between the tire valve and the air supply hose when the tire pressure gauge is in use,

(g) air release means operably connected to said first end wall at said third opening of said air chamber,

(h) electronic air pressure measuring means located within said enclosure and operably connected at said fourth opening of said air chamber, said electronic air pressure measuring means being electrically operable to determine the air pressure within said air chamber and display the measurement, and,

(i) whereby, said casing means is sized for being held with one hand while an air pressure hose is applied at said air supply hose engagement means, and air may be released through said air release mans by a finger of the one hand gripping the casing.

4,998,439

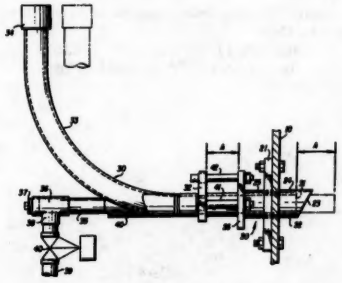
ACOUSTIC WAVE GUIDE

Michael L. Shepard, Covington, Va., assignor to Westvaco Corporation, New York, N.Y.

Filed Jan. 8, 1990, Ser. No. 461,740

Int. Cl.[5] G01N *29/14, 29/28;* F22B *37/42*

U.S. Cl. 73—592 3 Claims



1. An acoustic wave guide unit for receiving sonic emissions from a boiler combustion chamber, said unit comprising a wave guide tube and a boiler wall mounting bracket, said bracket comprising a cylindrical tube shield having a projection length extending into said combustion chamber through a boiler wall aperture and mounting means for securing said bracket to said boiler wall, an open bore within said tube shield for slidably and coaxially receiving therewithin a reception end of a wave guide tube, means for mounting a sonic trans-

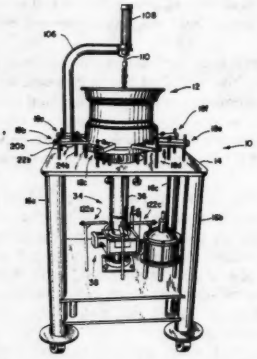
ducer at an opposite end of said wave guide tube, and, linear motor means secured between said mounting bracket and said wave guide tube to selectively displace said wave guide reception end coaxially within said tube shield.

4,998,440

APPARATUS AND METHOD FOR FATIGUE TESTING A WHEEL

Stanley J. Baumel, 3400 Lagoon Dr., Burlington, Wis. 53105

Filed Nov. 29, 1989, Ser. No. 443,217
Int. Cl.[5] G01N *3/32*
U.S. Cl. 73—810 17 Claims



1. An apparatus for fatigue testing a vehicle wheel, comprising:

wheel support means for maintaining said wheel stationary; and

fatigue stress-inducing means connectable to said wheel for inducing stress in said wheel in a manner so as to stimulate stress induced in said wheel when said wheel is mounted to a vehicle, comprising:

means for applying a moment to said wheel;

means for rotating said moment applying means; and

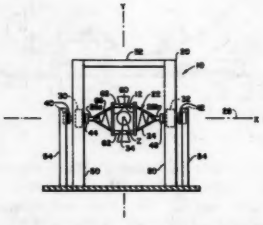
means for varying the moment applied to said wheel during rotation of said moment applying means.

4,998,441

FORCE AND TORQUE MEASUREMENT SYSTEM

Keith O. Stuart, Cypress, Calif., assignor to Aura Systems, Inc., El Segundo, Calif.

Filed Jul. 11, 1989, Ser. No. 378,152
Int. Cl.[5] G01C *71/12;* G01L *5/16*
U.S. Cl. 73—862.04 11 Claims



1. A system for measuring a force applied to a mass so that the magnitude and direction of the force can be determined, said system comprising, in combination:

means for mounting said mass so that the mass is suspended in a predetermined position and orientation relative to a three-dimensional coordinate system defining three mutually perpendicular axes;

means for generating a plurality of signals as a function of the measured force components of the force applied to the mass along the respective axes, said means for generating comprising:

first means for generating a first plurality of signals as a function of the measured axial displacement of said mass along each of said three mutually perpendicular axes;

second means for generating a second plurality of signals as a function of the measured acceleration of said mass along each of said three mutually perpendicular axes; and

means, responsive to said first and second plurality of signals, for providing counter forces on the mass so as to maintain the mass in the predetermined position and orientation; and

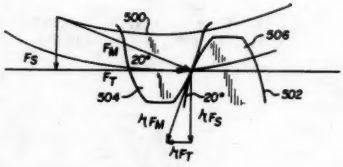
means for processing said first and second plurality of signals for determining the magnitude and direction of said force applied to said mass as a function of said force components.

4,998,442

GANTRY ROBOT CONSTRUCTION AND DRIVE MECHANISM

Gordon T. Brown, 2045 Murdstone Rd., Pittsburgh, Pa. 15241, and David A. Stewart, 2221 Ben Franklin Dr., Pittsburgh, Pa. 15237

PCT No. PCT/US89/02341, § 371 Date Oct. 30, 1989, § 102(e) Date Oct. 30, 1989, PCT Pub. No. WO89/12019, PCT Pub. Date Dec. 14, 1989
Continuation-in-part of Ser. No. 200,406, May 31, 1980. This PCT application May 30, 1989, Ser. No. 435,538
Int. Cl.[5] F16H *27/02, 55/08*
U.S. Cl. 74—89.17 11 Claims



1. A rack and pinion comprising:

rack means; and

pinion means for conversion between rotary and rectilinear motion;

one of said rack means and pinion means comprising rotatable pins; and

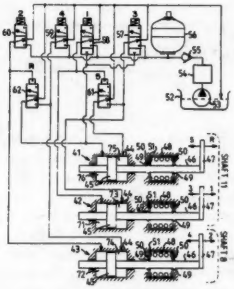
the other of said rack means and pinion means comprising teeth whose profile comprises an involute generated from a base circle which is congruent with the pitch circle of the other of said rack means and pinion means, whereby there is substantially a zero degree pressure angle between the pins and the teeth.

4,998,443

CONTROL SYSTEM FOR AUTOMATIC GEARBOXES IN WHICH GEAR CHANGES ARE EFFECTED STEPWISE

Grzegorz Janiszewski, Angered, Sweden, assignor to AB Volvo, Goteborg, Sweden

PCT No. PCT/SE88/00589, § 371 Date Apr. 17, 1990, § 102(e) Date Apr. 17, 1990, PCT Pub. No. WO89/04432, PCT Pub. Date May 18, 1989
PCT Filed Nov. 1, 1988, Ser. No. 473,966
Claims priority, application Sweden, Nov. 2, 1987, 8704269
Int. Cl.[5] B60K *20/10*; F16H *3/08*
U.S. Cl. 74—335 5 Claims



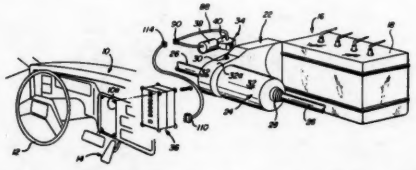
1. A system for controlling the gear changing process in a mechanical, step-change automatic gearbox of the kind having two inputs shafts arranged to be driven alternately, and two intermediate shafts which carry gear wheels in engagement with gear wheels on the input shafts, and in which system at least one gear wheel of each pair of mutually engaging gear wheels can be disengaged from its respective shaft, and said system further including pressure-medium activated piston-cylinder devices for engaging and disengaging said disengageable gear wheels, and a control circuit including valve means for regulating the flow of working medium to and from the piston-cylinder devices, characterized in that the control circuit includes at least two valve means (57, 58; 59, 60) one of which when activated causing engagement of only first disengageable gear wheel (21; 24), the other one when activated causing engagement of only a second disengageable gear wheel (22; 25), said valve means when activated through causing said first and second gear wheel to be disengaged and a third gear wheel (26; 30) to be engaged.

4,998,444

CONTROL SYSTEM FOR ELECTRIC SHIFT APPARATUS

Brian Mabee, Sterling Heights, Mich., assignor to Automotive Products (USA) Inc., Auburn Hills, Mich.

Continuation-in-part of Ser. No. 323,825, Mar. 19, 1989, and a continuation-in-part of Ser. No. 311,982, Feb. 16, 1989, Pat. No. 4,922,769, which is a continuation-in-part of Ser. No. 108,812, Oct. 15, 1987, Pat. No. 4,817,471. This application Jan. 22, 1990, Ser. No. 468,276
Int. Cl.[5] B60K *20/10*
U.S. Cl. 74—335 23 Claims



1. A control system for use with a motor vehicle transmission of the type providing a plurality of shift mode positions and including a mode select member selectively movable to selectively provide the various shift mode positions, said system comprising:

a control assembly adapted to be positioned in the passenger compartment of the vehicle and including operator accessible means for generating a plurality of operator request signals corresponding respectively to each transmission shift position; and

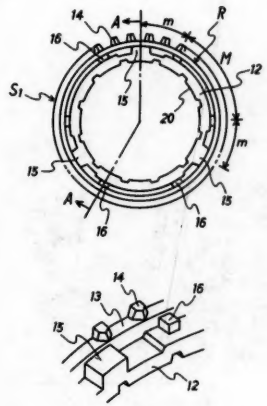
means operative in response to operator generation of an operator request signal to move said mode select member at an initial speed that varies with the distance that the mode select member must move to achieve the shift position corresponding to the operator request signal.

4,998,445

SYNCHRONIZER RING

Hideaki Fujiwara, Toyama, Japan, assignor to Tanaka Seimitu Kogyo Kabushiki Kaisha, Toyama, Japan

Filed Nov. 1, 1989, Ser. No. 430,633
Int. Cl.[5] F16H *3/38*
U.S. Cl. 74—339 7 Claims



1. A synchronizer ring comprising:

a boss;

three projections disposed on the peripheral surface of the boss at the angular interval of 120°;

a round elastic ring engaged with and supported by the three projections; and

at least three protrusions on the peripheral surface of said boss, said protrusions being respectively disposed at both sides or one side of the three projections and spaced away from the projections and adjacent thereto for supporting the round elastic ring, the protrusions having radially outer surfaces which each define an arc having a diameter which is the same as an inner diameter of the round elastic ring.

4,998,446

MOUNTING ARRANGEMENT FOR TRANSMISSION SHIFT CABLES

Raymond A. Towne, Canton; Robert T. Snow, Farmington Hills, and Harry J. Preseby, Fair Haven, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Dec. 22, 1989, Ser. No. 455,672
Int. Cl.[5] G05G *9/00*; F16B *7/04*
U.S. Cl. 74—473 R 6 Claims

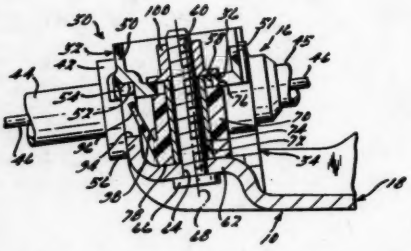
1. A two-piece molded synthetic plastic mounting arrange-

ment for securing a pair of identical side-by-side actuator cable assembly conduit metal end fittings to a vehicle drive train component provided with a metal support base having an upstanding peripheral flange formed with edge portions, each said conduit end fitting having a circumferential groove formed therein, said mounting arrangement comprising:

a threaded fastener extending vertically upwardly from said support base, said fastener spaced a predetermined longitudinal distance from said base upstanding flange;

said two-piece cable mounting arrangement comprising an upper-half section and a lower-half section, said lower-half section being generally rectangular in plan and formed with a central upstanding integral column portion having an upper end, a through bore aligned on the principal axis of said column portion adapted to receive said fastener therethrough, integral retaining finger means formed on said lower-half section adapted for engagement with window means in said support base upstanding flange;

said lower-half section molded with a pair of upwardly facing longitudinally extending laterally spaced apart arcuate furrows symmetrically formed on either side of said column portion for nested reception thereon of an associated one of said conduit end fittings, whereby a



portion of each said conduit end fitting circumferential groove engaging therein an associated conforming one of said support base upstanding flange edge portions;

said upper-half section formed with a central horizontally extending wall portion interconnecting a pair of integral laterally spaced apart shell portions, each said shell portion molded with a downwardly facing arcuate inner surface portion such that each furrow in said lower-half section faces the corresponding arcuate inner surface portion of said upper-half section associated shell portion for receiving in a complemental manner one of said conduit end fittings therebetween;

said upper-half section central wall portion having a longitudinally elongated opening therein aligned to receive said fastener therethrough with said central wall portion supported on said column portion upper end, a central tongue portion extending upwardly from said support base flange defining a free upper edge, locating notch means integrally formed on said upper-half section adapted to snugly receive therein said central tongue portion upper free edge;

whereby upon a nut being threaded on said fastener said pair of end fittings being releasably captured by said mounting arrangement on said support base.

4,998,447

DEVICE FOR COUPLING AND/OR UNCOUPLING AT LEAST THE CORES OF TWO CABLE LINE SECTIONS

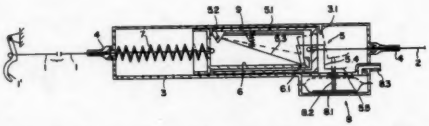
Dieter Feichtiger, Aidlingen; Horst Holzhauer, Schellbronn; Rudi Kneib; Marko Polic, both of Sindelfingen, and Gunther Weikert, Weil der Stadt, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Filed Jan. 26, 1989, Ser. No. 301,838

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1988, 3802107

Int. Cl.[5] F16C *1/22*

U.S. Cl. 74—502.6 **16 Claims**



1. Device for coupling and/or uncoupling at least the core of two cable line sections which transmit tensile forces during control movements, particularly two sections of a remote hood lock release cable line in a motor vehicle, by creating and/or cancelling a positive engagement between first and second corresponding shaped parts connected firmly, at least indirectly, each to an end of a cable line core, which are arranged guided in a common movement direction of the two cable line cores for displacement in common with the latter when the shaped parts are in positive engagement with each other, comprising the first and second shaped parts are preloaded by a spring force provided by a spring into a defined rest position within a housing which permits the shaped parts to move in common with the cable line cores when the shaped parts are in positive engagement with each other and accommodates mutually facing ends of the cable line cores and the shaped parts and wherein a control member is provided in the housing which is movable by a control element by remote control with external force into two mutually opposite limit positions and is at least indirectly operatively associated with the first of the shaped parts, at least in its defined rest position, to create and cancel the positive engagement of the first shape part with the second shaped part.

4,998,448

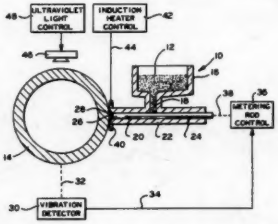
ALUMINUM DRIVESHAFT WITH BALANCING COMPOSITION

William P. Ellis, Jr., Toledo, Ohio, assignor to Dana Corporation, Toledo, Ohio

Continuation of Ser. No. 818,388, Jan. 13, 1986, abandoned, which is a continuation of Ser. No. 718,190, Apr. 1, 1985, abandoned, which is a continuation of Ser. No. 586,631, Mar. 2, 1984, abandoned, which is a continuation of Ser. No. 371,790, Apr. 26, 1982, abandoned. This application Jul. 3, 1990, Ser. No. 457,376

Int. Cl.[5] F16F *15/22*; C03J *4/00*; B60B *1/00*

U.S. Cl. 74—573 R **12 Claims**



1. An article comprising an aluminum driveshaft which is

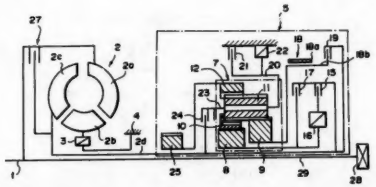
adapted to rotate in service about an axis through the driveshaft, but is unbalanced relative to rotation about the axis, and balancing means comprising a polymer carrier cured by the application of ultraviolet light of an adhesive composition and a particulate material having a density higher than said adhesive composition dispersed therein, said particulate material including metal particles having a particle size in the range of 0.080 to 0.120 inches and comprising 90% to 94% of said balancing means by weight, predetermined amounts of said balancing means being adhered at selected locations on the outer surface of the driveshaft to balance the article for rotation about the axis.

4,998,449

DUTY SOLENOID VALVE CONTROL SYSTEM FOR AN AUTOMATIC TRANSMISSION

Fumiaki Baba, and Jyujiro Oda, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 25, 1989, Ser. No. 342,855
Claims priority, application Japan, Apr. 27, 1988, 63-105116
Int. Cl.[5] B60K *41/18*
U.S. Cl. 74—844 **3 Claims**



1. A duty solenoid valve control system for controlling a duty solenoid valve which controls a pilot pressure to be fed to a hydraulic pressure control valve which produces a hydraulic pressure according to the pilot pressure in an automatic transmission including an oil temperature detecting means for detecting the temperature of the hydraulic oil and a driving period changing means which receives an output from the oil temperature detecting means and changes the driving period of the duty solenoid valve according to the temperature of the hydraulic oil so that the driving period is long when the temperature of the hydraulic oil is low and short when the temperature of the hydraulic oil is high,

said hydraulic pressure control valve produces a hydraulic pressure for driving a friction element which is selectively applied or released in order to change the power transmitting path of the automatic transmission, thereby effecting gear-shifting, said friction element having a piston which applies and releases the friction element and the hydraulic pressure produced by the hydraulic pressure control valve acting on the piston,

wherein the hydraulic pressure which acts on the piston during the shifting of the gears is changed in a predetermined manner which is determined according to the engine load, and the duty cycle of the duty solenoid valve is changed so that the pilot pressure is changed, which controls the hydraulic pressure control valve so that it changes the hydraulic pressure control predetermined manner, the change in the duty cycle being determined taking into account the driving period of the duty solenoid valve which is determined according to the oil temperature,

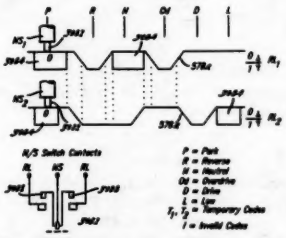
and wherein said piston is urged to release said friction element by hydraulic pressure in a first hydraulic pressure chamber and at the same time urged to apply the same by hydraulic pressure in a second hydraulic pressure chamber so that the piston applies the friction element when the hydraulic pressure in the first hydraulic pressure chamber becomes lower than the hydraulic pressure in the second hydraulic pressure chamber, and said hydraulic pressure control valve changes the hydraulic pressure in the first hydraulic pressure chamber with the hydraulic pressure in the second hydraulic pressure chamber kept constant.

4,998,450

NEUTRAL START SWITCH TO SENSE SHIFT LEVER POSITION

Thomas D. Nogle, Troy, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Continuation of Ser. No. 188,611, Apr. 29, 1988, abandoned.
This application Feb. 27, 1990, Ser. No. 492,269
Int. Cl.[5] B60K *41/06*
U.S. Cl. 74—850 **5 Claims**



1. In a vehicle transmission including an input member, an output member, a gear assembly for changing the ratio of torque between the input member and output member, a plurality of friction elements for shifting the gear assembly, input sensors providing input signals indicative of predetermined conditions, a controller having memory for processing and storing the input signals and predetermined values and providing output signals to control the friction elements, a neutral start switch assembly for sensing the position of a manually operated shift lever to select between a plurality of predetermined operating modes of the transmission such as park, reverse, neutral, overdrive, drive and low (PRNODDL), comprising:

a plate member movable in response to movement of the shift lever and provided with a cam surface composed of electrically conductive and non-conductive areas;

at least two separate neutral start switches mounted in the transmission and positioned to communicate with the cam surface of the plate member; and

electrical contact means associated with each separate neutral start switches such that a binary code is generated by each of the separate neutral start switches such that the combination of the binary codes is indicative of the shift lever position to allow the controller to determine the predetermined operating mode of the transmission based on the combination of the binary codes.

4,998,451

LINE PRESSURE CONTROL ARRANGEMENT FOR AUTOMATIC AUTOMOTIVE TRANSMISSION

Akihiko Sano, Fujisawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Jul. 6, 1989, Ser. No. 376,287
Claims priority, application Japan, Jul. 6, 1988, 63-166983
Int. Cl.[5] B60K *41/18*
U.S. Cl. 74—867 **9 Claims**

1. A transmission line pressure control arrangement for controlling line pressure for a whole transmission comprising:

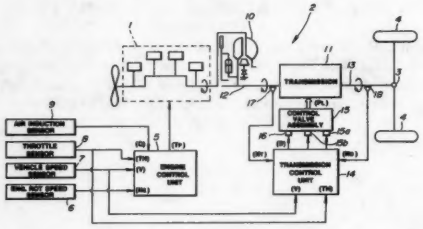
a transmission input shaft rotational speed sensor;

a transmission output shaft rotational speed sensor;

means for deriving a ratio of transmission input shaft rotation speed to transmission output shaft rotational speed;

total shift time determining means for determining a single total shift time which elapses between a point in time when a shift command is issued and a point in time when

said ratio is detected as having changed from a first value indicative of a first predetermined gear to a second value indicative of a second predetermined gear; and



means for adjusting line pressure for said whole transmission in a manner which brings said total shift time to a target value for an instant shift.

4,998,452

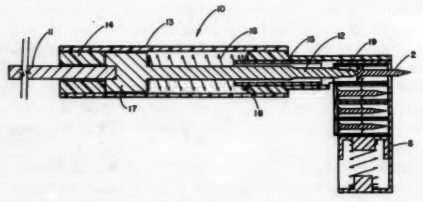
CARTRIDGE AND MAGAZINE APPARATUS FOR STORAGE AND AUTOMATIC FEED OF SCREW FASTENERS

Kurt E. Blum, 907 E. Burton St., Murfreesboro, Tenn. 37130

Continuation-in-part of Ser. No. 173,574, Mar. 25, 1988, abandoned. This application Aug. 28, 1989, Ser. No. 399,024

Int. Cl.[5] B25B *23/02*

U.S. Cl. 81—57.37 **1 Claim**



1. An apparatus for holding, feeding, and centering screws in cartridges for use with a powered drill having a chuck comprising:

(a) a cylinder having a bore placed through it, said bore having a first end and a second end;

(b) a stop having a forwardly facing surface toward said second end and a rearwardly facing surface toward said first end slidably received and directed by said bore;

(c) means for preventing said stop from exiting said first end and said second end;

(d) a shank centrally aligned with said bore and attached to said rearwardly facing surface of said stop, said shank adapted for insertion into said chuck, said shank passing through said first end;

(e) a shaft centrally aligned with said bore and attached to said forwardly facing surface of said stop, said shaft passing through said second end;

(f) means for biasing said stop away from said second end;

(g) a screwdriving bit coaxially attached to said shaft distally from said stop;

(h) a magazine releasably received by said cylinder proximate to said second end, said magazine having a container for receiving said cartridges, said magazine having a chamber aligned with said bore when said magazine is received by said apparatus;

(i) said bit adapted for engagement of said screws in said cartridges in said chamber when said magazine is received by said cylinder;

(j) a means for biasing said cartridges toward said chamber;

(k) said chamber having a lateral slot adapted for receiving said cartridge not held in said container and discarding said cartridges from said chamber;

(l) means for ejecting said cartridges from said slot of said magazine; and

(m) said ejector means comprising a finger-push piston placed through a hole inside of said magazine placed adjacently to said chamber and biased away from said magazine by a spring.

4,998,453

HYDRAULIC BOLT TENSIONER

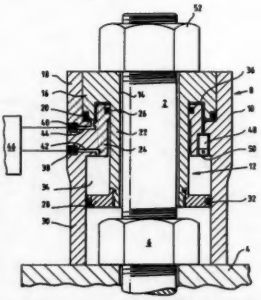
John N. Walton, Whitley Bay, and David Campbell, Ashington, both of England, assignors to Hedley Purvis Limited, Morpeth, England

Filed Oct. 3, 1989, Ser. No. 416,509

Claims priority, application United Kingdom, Oct. 6, 1988, 8823474

Int. Cl.[5] B25B *29/02*

U.S. Cl. 81—57.38 **7 Claims**



1. A hydraulic bolt tensioner for tensioning a threaded bolt extending rom a fixed component, the bolt carrying a threaded reaction member thereon, the tensioner comprising:

a cylinder adapted to react against the fixed component,

a piston slidably mounted in the cylinder and defining therein an axial bore through which, is use, said bolt extends, the piston being adapted to react against said reaction member, the configurations of the piston and the cylinder being such as to define within the cylinder first and second chambers, and

a source of hydraulic fluid under pressure connected to both the first and the second chambers for effecting powered movement of the piston within the cylinder, the arrangement being such that on supply of fluid under pressure from the source to the first chamber, powered extension of the piston within the cylinder is effected, and on supply of fluid under pressure from the source to the second chamber, powered retraction of the piston within the cylinder is effected.

4,998,454

SCREWDRIVER BIT FOR PHILLIPS-HEAD FASTENERS

Peter C. Chaconas, Glyndon, and Paul A. Stone, Westminster, both of Md., assignors to Black & Decker Inc., Newark, Del.

Continuation-in-part of Ser. No. 270,000, Nov. 14, 1988, abandoned. This application Nov. 20, 1989, Ser. No. 439,603

Int. Cl.[5] B25B *23/00*

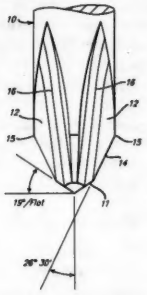
U.S. Cl. 81—460 **72 Claims**

1. A driver for applying torque to a fastener having a standard Phillips cross-shaped recess formed in the head of the fastener, the standard Phillips cross-shaped recess comprising four equally radially spaced recess wings having side surfaces and outer radial surfaces, the outer radial surfaces thereof converging toward a common point at a predefined standard wing angle relative to the axis of the fastener, the side surfaces of adjoining recess wings defining a predefined standard in-

cluded angle that remains substantially constant from the bottom of said recess wings to the top of said recess, and wherein the sidewalls of said recess wings are angled at a predefined standard root angle relative to said axis;

the driver having associated therewith an axis and including a bit portion symmetrical about any plane containing the axis of the driver and adapted for insertion into said recess comprising:

four bit wings having side surfaces and radially outward facing surfaces, the radially outward facing surfaces converging at an angle relative to the axis of said bit portion substantially equal to said predefined standard wing angle,



and wherein the side surfaces of adjoining bit wings define a root that is oriented relative to said axis at an angle substantially equal to said standard root angle, and further wherein said side surfaces of adjoining bit wings define an included angle that increases progressively in the axial direction from a first angle at least as great as said standard included angle adjacent the base of said bit wings to a second greater included angle at an axially spaced distance therefrom, such that when said bit portion is inserted into the recess of a standard Phillips-head fastener, initial contact is created between the recess and said bit portion on the side surfaces of said bit wings.

4,998,455

AUTOMATIC LATHE FOR MACHINING WORK BARS

Kurt Jauch, Stritzling 191, 8351 Lalling, Fed. Rep. of Germany

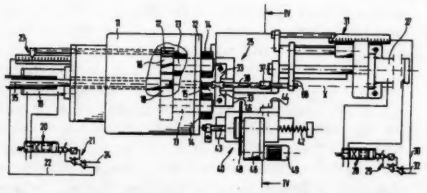
PCT No. PCT/EP88/01011, § 371 Date Jul. 6, 1989, § 102(e) Date Jul. 6, 1989, PCT Pub. No. WO89/04227, PCT Pub. Date May 18, 1989

PCT Filed Nov. 8, 1988, Ser. No. 391,529

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1987, 3738059

Int. Cl.[5] B23B *13/00, 17/00*

U.S. Cl. 82—127 **8 Claims**



1. An automatic lathe for machining work bars responsively to control signals received from a program-steered central control unit comprising:

a head stock (11) which supports a tool head (12) driven in rotation about the axis of a nonrotating work bar for the machining thereof;

a rear feeding means (57) for axially feeding a work bar (35) through said head stock (11) and through said tool head (12);

a front chuck means (25) movable back and forth in axial direction for gripping an area of said work bar (35) which has been pushed through said head stock (11) and said tool head (12) and including means for imparting forwardly directed axial motion to said bar;

severing means (40) for cutting machined work pieces (37) from said work bar (34);

means associated with said rear feeding means for steadily advancing a work bar (35) up to said chuck means (25) and being movable by said control unit into a retracted position ready to receive another work bar (35) before the preceding work bar (35) has been used up, said front chuck means (25) being movable back and forth in axial direction, independently of said rear feeding means (57);

front chuck feed drive means (27) for moving said front chuck in said axial direction;

front chuck position pickup means (31) associated with said front chuck feed drive means (27) for providing to said central control unit a sensing signal indicative of the position of said front chuck means,

first sensing means (67) associated with said head stock for providing a first control signal when the rear end of the work bar (35) being machined moves past said first sensing means, and

said central control unit includes means responsive to provision of said first control signal for counting the number of additional work pieces (37) made from said work bar (35) and for switching to a program which differs from the regular program of motions of said feed drive means (27) of said front chuck means (25) to pull out the remainder (39) of said work bar (35) as soon as the count of work pieces equals a calculated number of work pieces.

4,998,456

BODY CONSTRUCTION OF A WIND INSTRUMENT AND PROCEDURE FOR PRODUCING A WIND INSTRUMENT WITH SAID CONSTRUCTION

Matti Kähönen, Provoonkatu 37 A 4, 00520 Helsinki, Finland

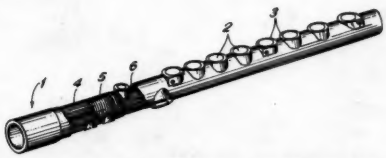
PCT No. PCT/FI88/00088, § 371 Date Mar. 1, 1989, § 102(e) Date Mar. 1, 1989, PCT Pub. No. WO88/09986, PCT Pub. Date Dec. 15, 1988

PCT Filed Jun. 8, 1988, Ser. No. 313,979

Claims priority, application Finland, Jun. 8, 1987, 872561

Int. Cl.[5] G10D *7/02*

U.S. Cl. 84—384 **3 Claims**



1. A body construction of a flute, comprising an elongated tube composed of at least one part, the tube being provided with openable and closable apertures for playing, the tube, or its parts consisting of an epoxy plastic material reinforced with carbon fibres.

4,998,457

HANDHELD MUSICAL TONE CONTROLLER

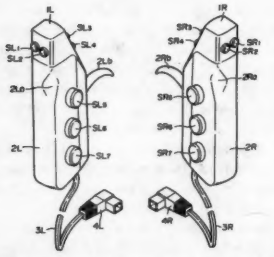
Hideo Suzuki; Shunichi Matsushima; Masahiko Obata, and Masao Sakama, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Dec. 22, 1988, Ser. No. 289,330

Claims priority, application Japan, Dec. 24, 1987, 62-328068; Dec. 24, 1987, 62-328069; Dec. 24, 1987, 62-196199

Int. Cl.[5] G10H *1/34, 1/46*

U.S. Cl. 84—600 10 Claims



1. A musical tone control apparatus for providing control data to a musical tone generating apparatus comprising:

(a) detecting means having a shape adapted to be held by one hand of a player, said detecting means outputting a detection signal representing the amount of depressing pressure applied thereto by a finger of the player when said detecting means is held by hand; and

(b) musical tone control means for outputting musical tone control data based on said detection signal outputted from said detecting means, said musical tone control data controlling a musical tone generating apparatus, said musical tone generating apparatus being provided externally from the tone control apparatus in order to generate a musical tone which is controlled in response to said depressing pressure.

4,998,458

DEVICE FOR LOADING AN ARMORED WEAPON

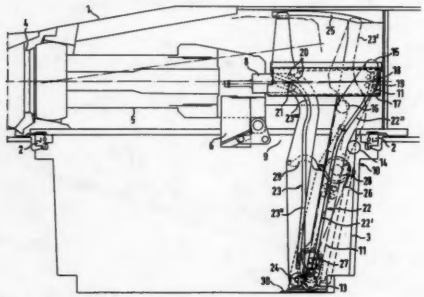
August Schiele, and Gert Kausträter, both of Augsburg, Fed. Rep. of Germany, assignors to Kuka Wehrtechnik GmbH, Augsburg, Fed. Rep. of Germany

Filed Apr. 10, 1987, Ser. No. 41,123

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1986, 3612208

Int. Cl.[5] F41A *9/20*

U.S. Cl. 89—46 18 Claims



1. Device for loading an armored weapon with large caliber cartridges, which are kept ready on a floor of a loading area of a tank, wherein

(a) a conveyor device (10) leading from the bottom of the loading area into a turret at the rear of a breech of the weapon (4), consisting of a transport container (17) for holding the cartridge (8) and a continuous belt (11), driven by a motor,

(b) a guide device, consisting of a set of guide rollers (19, 20), arranged on each end of the transport container (18) and two guide tracks (22, 23), one each assigned to each set of rollers, which bring the transport container (17) with the inserted cartridge (8) form an approximately vertical position at the foot of the conveyor device (10) to a horizontal position, aligned with the weapon (4) at the rear of the breech of the weapon (4),

(c) a rammer (33) which, with open breech, speeds the cartridge (8) into the chamber (5) of the weapon from the transport container,

wherein the guide track (22) for the roller set (19) at the rear end of the transport container (17) is rigidly arranged and the guide track (23) for the roller set (21) at the front end of the transport container (17) is mounted at the foot (24) of the conveyor device (10) in such a manner that, during the loading process, it can be pivoted with its upper end from a position (23') removed from the rear of the breech of the weapon (4) into a position at the rear of the breech and during the return of the empty transport container (17) again into the removed position (23').

4,998,459

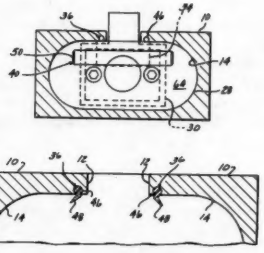
RODLESS FLUID ACTUATED MOTOR WITH IMPROVED SEALING CHARACTERISTICS

John A. Blatt, 47 Willison, Grosse Pointe Shores, Mich. 48236

Filed Sep. 22, 1989, Ser. No. 410,818

Int. Cl.[5] F01B *29/00*

U.S. Cl. 92—88 9 Claims



1. A rodless fluid actuated motor comprising:

an elongated housing having a longitudinally extending radial slot and a longitudinally extending aperture in communication with the radial slot;

a reciprocal piston member slidably disposed within the longitudinally extending aperture of the housing for reciprocal movement from one end limit of movement to another end limit of movement, the piston member having a first piston portion longitudinally spaced from a second piston portion, a lug portion connecting the first and second piston portions to one another, the lug portion having a tongue extending outwardly through the radial slot of the housing, a carriage connected to the tongue of the lug portion carried external of the housing and reciprocal with the piston member, the piston member dividing the longitudinal aperture into three separate independent chambers, a first expansible chamber disposed between the first piston portion and a first longitudinal end of the housing, a second expansible chamber disposed between the second piston portion and a second end of the housing, and a third chamber disposed between the first and second piston portions;

an elongated band extending longitudinally within the aperture of the housing, such that the band straddles the radial

slot in the housing and is engageable with an interior surface of the longitudinally extending aperture;

elongated seal means extending longitudinally along the radial slot in the housing disposed between the band and the housing on both sides of the radial slot for releasably sealing the first and the second chambers within the housing, wherein said seal means includes first and second seal members supported on an interior surface of said longitudinally extending aperture of said housing;

band retaining means for securing the band to the housing while the band is in a state of tension; and

means for unsealing the band supported by the lug portion of the piston member, wherein the piston member reciprocates from one end limit of movement to another end limit of movement within the housing as the first and second chambers expand and retract in response to fluid being introduced within one chamber while fluid is exhausted from the other chamber.

4,998,460

PISTON ENGINE

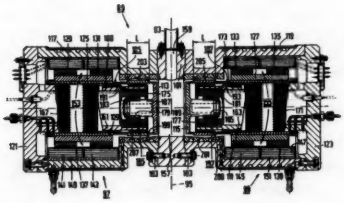
Marc J. M. Wolfs, and Andreas J. Garenfeld, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

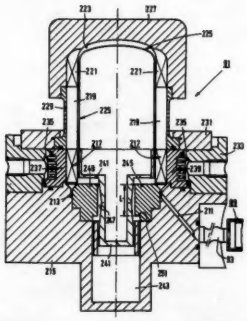
Filed May 26, 1989, Ser. No. 358,318

Claims priority, application Netherlands, Nov. 14, 1988, 8802786

Int. Cl.[5] F01B *31/00*

U.S. Cl. 92—162 R **21 Claims**





1. An apparatus comprising a piston which is reciprocable in a gas-filled cylinder and divides the cylinder into a first chamber and a second chamber, between which chambers a gas pressure difference exists during piston reciprocation, the outer wall of the piston and an inner wall of the cylinder defining a gap therebetween which gap communicates the first chamber with the second chamber and is different in size in annular cross-sections transverse to the direction of movement of the piston, characterized in that:

The gap is concave and on either side of a reversing plane transverse to the direction of movement of the piston the gap is tapered such that a cross-section of the gap located near a first boundary plane of the gap and a cross-section of the gap located near a second boundary plane of the gap have a smaller surface area than a cross-section of the gap near the reversing plane of the gap, and the pressure difference across the gap between the first and the second boundary plane is substantially equal to the pressure difference between the first and second chambers, the tapered form of the gap extending on either side thereof beyond the boundary planes of the gap over a distance at least equal to half a piston stroke in the central position of the piston.

4,998,461

TWO-PART PLASTIC PISTON WITH EXCESS RESIN RECEIVING GROOVE

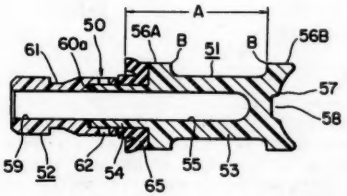
Ichiro Ishiwata, and Tomomichi Karasuyama, both of Kanagawa, Japan, assignors to Nippon Air Brake Co., Ltd., Kobe, Japan

Filed Jan. 30, 1989, Ser. No. 303,660

Claims priority, application Japan, Aug. 3, 1988, 63-29746[U]

Int. Cl.[5] F16J *9/00*

U.S. Cl. 92—248 **1 Claim**



1. A plastic cylinder of a master cylinder, comprising:

a first member made of plastic and composed of a large diameter portion slidable inside a cylinder bore, and a small diameter portion extending axially from the large diameter portion for forming a stepped portion on the large diameter portion;

a second member made of plastic and having therein a large bore portion having an inner end;

said small diameter portion of said first member being inserted into and engaged with said large bore portion of said second member and forming a seal ring mounting groove on an outer peripheral surface of said small diameter portion between said stepped portion and the end of said large bore portion of said second member, the length of said small diameter portion in said large bore portion being less than the length of said large bore portion for defining a gap between the end of said small diameter portion and the inner end of said large bore portion, and said small diameter portion having a weld material receiving groove therearound spaced from said gap; and

a welding portion between the outer peripheral surface of said small diameter portion and extending along the length thereof between said weld material receiving groove and said gap;

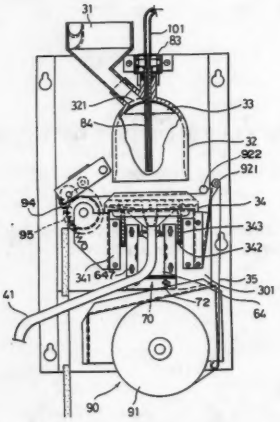
whereby when said first and second members are welded to each other at said weld portion, excess welding resin will flow only into said gap and said weld material receiving groove and will be prevented from escaping to the exterior surface of said large bore portion or to said seal ring mounting groove.

4,998,462

BEVERAGE EXTRACTING APPARATUS FOR VENDING MACHINES

Ryoichi Sekiguchi, Isesaki, Japan, assignor to Sanden Corporation, Gunma, Japan

Continuation-in-part of Ser. No. 441,476, Nov. 27, 1989, abandoned. This application Jun. 22, 1990, Ser. No. 542,039
Claims priority, application Japan, Nov. 28, 1988, 63-154399; Jun. 23, 1989, 1-161901
Int. Cl.[5] A47J *31/32*
U.S. Cl. 99—289 T 26 Claims



1. A beverage extracting apparatus for vending machines comprising:

a cylinder having an inflow port on its upper portion and an opening on its bottom portion, into which a liquid mixture of water and a raw material of a beverage is introduced through the inflow port;

valve means for opening and closing said inflow port of said cylinder;

filter means for covering said bottom opening of said cylinder;

filter support means for supporting said filter means from the lower side of said filter means, the filter support means opening and closing said bottom opening of said cylinder by vertically moving said filter means;

pressurization means for supplying pressurized air into said cylinder through an air path when said inflow port is closed by said valve means and said bottom opening is closed by said filter means to forcibly filtrate the liquid mixture stored in said cylinder through said filter means;

a filter support guide frame to vertically guide said filter support means, the filter support guide frame being adjustable in its vertical position;

filter support drive means for vertically moving said filter support means, the filter support drive means including a power source, a driving force transmitting mechanism, and a lever, said driving force transmitting mechanism moved vertically by said power source to vertically move said filter support means through said lever the longitudinally central portion of which is vertically pivotably supported by said filter support guide frame, the one end portion of which engages said driving force transmitting mechanism and the other end portion of which engages said filter support means; and

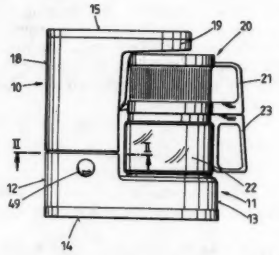
adjusting means engaging said filter support guide frame for adjusting the vertical position of said filter support guide frame.

4,998,463

MACHINE FOR BREWING COFFEE AND THE LIKE

Hans J. Precht; Klaus Beumer, and Bernd Scholz, all of Solingen, Fed. Rep. of Germany, assignors to Robert Krups Stiftung & Co. KG., Solingen, Fed. Rep. of Germany

Filed Dec. 1, 1989, Ser. No. 444,803
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1988, 8815627
Int. Cl.[5] A47J *31/30, 31/00*
U.S. Cl. 99—300 30 Claims



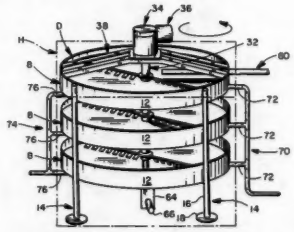
1. A beverage brewing machine comprising a housing having a container for a supply of liquid, said container having outlet means; electric liquid heating means including a conduit with a first inlet connected to said outlet means and an outlet for heated liquid and steam; a collecting receptacle having a second inlet communicating with said outlet and comprising a bottom wall, said receptacle further having at least one liquid discharging opening and at least one steam evacuating aperture which is inclined with reference to said bottom wall; and means for receiving liquid from said receptacle by way of said at least one opening.

4,998,464

HEAT EXCHANGE DEVICE FOR FOOD

Lawrence G. Kubacki, Downers Grove, Ill., assignor to Process Systems Inc.

Filed Jul. 2, 1990, Ser. No. 548,272
Int. Cl.[5] A23C *3/04;* A23G *1/18*
U.S. Cl. 99—455 20 Claims



1. A heat exchange device for continuously cooling or, in the alternative, heating a slurry of food consisting of solid lumps in a non-viscous liquid, comprising:

(a) a plurality of heat transfer trays, aligned with each other and interconnected in vertically spaced relationship;

(b) food inlet means connected to an uppermost tray and food outlet means connected to a lowermost tray;

(c) each of said trays including a round, horizontal plate and a vertical wall upstanding from the periphery of said plate;

(d) each of said plates having at least one internal passageway to accomodate the flow of fluid therethrough for cooling or, in the alternative, heating said plate;

(e) each of said plates having a radially disposed opening

extending vertically therethrough and free from alignment with an opening of any adjacent plate;

(f) means for slowly moving a food slurry over each plate until it reaches said plate opening where it can fall by gravity therethrough onto an adjacent lower plate, said means comprising:

(i) a rotatable drive shaft extending vertically through said plates;

(ii) a plurality of scraper members secured to said shaft, each of said members being adapted to engage food slurry on a related plate and move it toward an opening of said plate;

(g) each of said plates including a pair of radially disposed raised portions located on opposite sides of the plate opening to partially restrict the free flow of liquid from said plate through said opening.

4,998,465

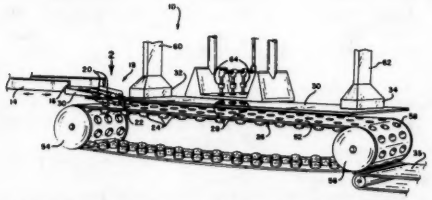
APPARATUS FOR PEELING GARLIC

Rich Fischer, Aromas; Richard Silva, Gonzales, and Henry P. Welton, Gilroy, all of Calif., assignors to Dalgety Produce, Inc., Salinas, Calif.

Continuation of Ser. No. 363,530, Jun. 8, 1989, abandoned. This application Aug. 23, 1990, Ser. No. 571,931

Int. Cl.[5] A23N *7/00, 15/08*

U.S. Cl. 99—584 **9 Claims**



1. Apparatus for peeling the outer skin from garlic cloves, comprising:

feeder means for providing a continuous supply of cloves to a plurality of different outlets;

a continuous belt driven along a closed path having an upper surface located immediately adjacent the outlets, said belt including a large number of openings each of which is aligned with a feeder means outlet as the belt moves along the path;

individual cup means positioned within the belt openings, each having an upwardly directed open top when located on the belt upper surface;

a plate located above the belt upper surface and in spaced generally parallel relation thereto, said plate having a plurality of openings each of which is brought into alignment with cup means as the belt moves therepast;

nozzle means inserted into each plate opening and actuatable for directing pressurized air into the cup means and onto cloves contained therein; and

means for moving air along and outwardly of the space between the belt upper surface and the facing plate surface to remove peeled clove outer skins.

4,998,466

BULB SLITTER

Tatsuo Nagaoka, Kabushikigaisha Nagaokaseikiseisakusho c/o No. 13-12, Minowacho 2-chome, Kohoku-ku, Yokohama-shi, Kanagawa, Japan

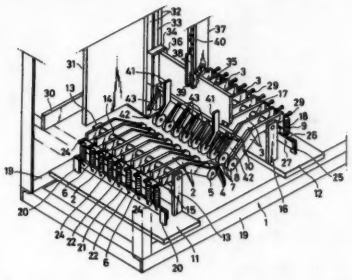
Filed Jul. 17, 1990, Ser. No. 553,310

Claims priority, application Japan, Jan. 23, 1990, 2-11880

Int. Cl.[5] A23N *7/00, 15/08*

U.S. Cl. 99—591 **11 Claims**

1. A bulb slitter comprising a frame, a plurality of first swinging elements mounted to said frame in juxtaposed relation to each other, a plurality of second swinging elements mounted to said frame in juxtaposed relation to each other, said first swinging elements having their respective one ends which are arranged in facing relation to one ends of the respective second swinging elements, said first and second swinging elements being mounted to said frame for angular movement toward and away from each other obliquely vertically, a plurality of first disc-like cutting edges mounted to said one ends of the respective first swinging elements for angular movement about an axis connecting said one ends of the respective first swinging elements to each other, a plurality of second disc-like cutting edges mounted to said one ends of the respective sec-



ond swinging elements for angular movement about an axis connecting said one ends of the respective second swinging elements to each other, first biasing means arranged at the other ends of the respective first swinging elements for biasing the one ends of the respective first swinging elements upwardly, second biasing means arranged at the other ends of the respective second swinging elements for biasing the one ends of the respective second swinging elements upwardly, and an urging assembly arranged above a space between said first swinging elements and said second swinging elements for vertical movement.

4,998,467

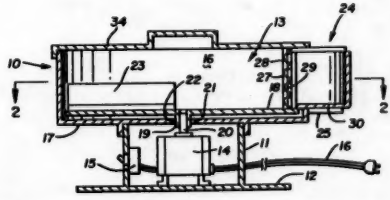
POTATO PEELING DEVICE

John R. Kovach, 2705 Normandy Dr., Youngstown, Ohio 44511

Filed Nov. 24, 1989, Ser. No. 440,860

Int. Cl.[5] A23N *7/00, 7/02; A47J 17/18*

U.S. Cl. 99—632 **3 Claims**



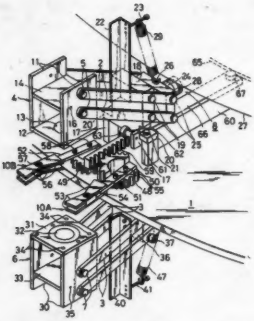
1. A motorized potato peeler comprises; a base enclosure, a motor and shaft within said enclosure, a removable container supported on said base enclosure, said container having a bottom, an annular side wall and a removable closure, a rotatable turntable in spaced relation to the bottom of said container, a fixed upstanding flange extending radially from said turntable, an abrasive plate positioned within a portion of said annular wall, means for interconnecting said motor and said shaft to said turntable, a peel receptacle secured to said annular side wall, means for cycleably reversing said directional rotation of said turntable and a source of power for said motor.

4,998,468

BULB CENTERING CLAMP APPARATUS

Tatsuo Nagaoka, Kabushikigaisha Nagaokaseikiseisakusho c/o No. 13-12, Minowacho 2-chome, Kohoku-ku, Yokohama-shi, Kanagawa, Japan

Filed Jul. 17, 1990, Ser. No. 553,306
Claims priority, application Japan, Jan. 23, 1990, 1-11881
Int. Cl.[5] A23N *15/04, 15/08*
U.S. Cl. 99—636 11 Claims



1. A bulb centering clamp apparatus comprising a rotary table rotatable about a vertical axis, a plurality of first parallel swing links angularly movable vertically and mounted above said rotary table, a plurality of second parallel swing links angularly movable vertically and mounted below said rotary table in facing relation to said first swing links, an upper gripper movable angularly in facing relation to one ends of the respective first swing links, said upper gripper having a gripping surface maintained horizontal, a lower gripper movable angularly in facing relation to one end of the respective second swing links, said lower gripper having a gripping surface maintained horizontal, a first cam mechanism including a first and a second cam followers and a first and a second stationary cams, for moving said upper and lower grippers toward and away from each other, said first and second cam followers being provided respectively at the other ends of the respective first and second swing links and being abutted respectively against said first and second stationary cams, a pair of side clamps arranged between said upper and lower grippers, and a second cam mechanism for moving said pair of side clamps toward and away from each other, said second cam mechanism including a third stationary cam and a third cam follower abutted against said third stationary cam and connected to said pair of side clamps.

4,998,469

METHOD OF WRAPPING BALES WITH TWINE

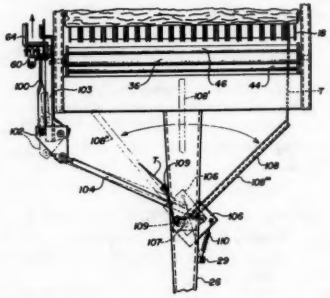
Anthony F. Diederich, Jr., Terre Hill, Pa., assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Apr. 23, 1990, Ser. No. 512,717
Int. Cl.[5] B65B *13/02*
U.S. Cl. 100—2 6 Claims

1. In a round baler for making cylindrical bales of crop material, apparatus for wrapping said bales including a feed roller and a knife, said wrapping apparatus having a feeding position wherein said feed roller is driven while said knife is retracted and a cutting position wherein said feed roller is latched while said knife is actuated, actuator means for moving said wrapping apparatus between said feeding and cutting positions, a twine arm connected to said actuator means for pivoting movement in order to dispense twine that is fed into the baler by said feed roller, said actuator means being extendable and retractable for causing pivotal movement of said twine arm between a twine dispensing position and a twine cutting position, a bale wrapping method comprising the steps of:

extending said actuator means to move said twine arm into said twine dispensing position and to simultaneously move said feed roller and said knife into said feeding position;

retracting said actuator means to move said twine arm from



said twine dispensing position toward said twine cutting position while maintaining said feed roller and said knife in said feeding position; and

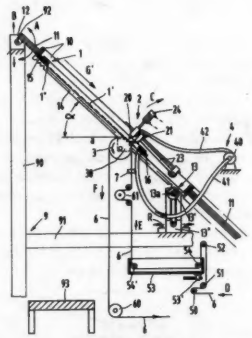
further retracting said actuator means to move said twine arm into said twine cutting position and to simultaneously move said feed roller and said knife from said feeding position to said cutting position.

4,998,470

SCREEN PRINTING MACHINE HAVING AN INCLINED SCREEN

Gerhard Klemm, Am Rehwinkel 37, D-4800 Bielefeld 1, Fed. Rep. of Germany

Continuation of Ser. No. 203,357, Jun. 6, 1988. This application Jan. 5, 1990, Ser. No. 463,878
Claims priority, application Fed. Rep. of Germany, Jun. 6, 1987, 3719059
Int. Cl.[5] B41F *15/10, 15/40, 15/36*
U.S. Cl. 101—115 22 Claims



1. A screen printing machine for the treatment of successive coherent sections of elongated webs which are advanced in a predetermined direction along a predetermined path, comprising a plurality of screen printing units including a first and a second printing unit, at least said first printing unit including a reciprocable flat screen at one side of a predetermined portion of said path; means for maintaining said screen in a plane which is inclined relative to the horizontal, including means for changing the inclination of the screen relative to the horizontal; first moving means for moving said screen relative to the

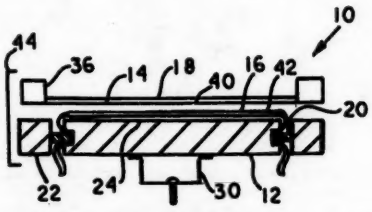
horizontal; second moving means for moving said screen forwardly in and rearwardly counter to said predetermined direction; web supplying means including a web-supporting and advancing cylinder rotatable about a fixed axis and disposed at the other side of said portion of said path, at least said other side of said portion of said path being accessible; and applicator means including means for including the flow of a printing medium through said screen and into contact with the web in said portion of the path, a source of printing medium, means for conveying printing medium from said source to said screen, means for returning non-applied printing medium from said screen to said source, and means for maintaining said flow including means in a predetermined orientation with reference to said screen, said flow including means being located opposite said cylinder and said screen being located between said flow inducing means and said cylinder, said screen being movable relative to said cylinder and relative to said flow inducing means between an upper end position and a lower end position and said flow inducing means being operative during movement of said screen from the lower end position toward the upper end position, said second printing unit being adjacent a second portion of said path and one of said path portions being located upstream of the other of said path portions.

4,998,471

SCREEN PRINTING SYSTEM AND METHOD

Robert J. Harrington, 3451 Harrington Rd., Dunkirk, N.Y. 14048

Filed Jan. 9, 1990, Ser. No. 462,561
Int. Cl.[5] B05C *17/08;* B41L *13/00*
U.S. Cl. 101—126 **7 Claims**



7. A hold down mechanism to uniformly stretch and securely restrain an article of apparel in a printing position in a screen printing system comprising:

a circular base having a substantially planar top face providing a printing area and a side face having a substantially cylindrical surface,

said side face having a groove extending generally around said cylindrical surface,

a rigid annular member having an inner and an outer circumference,

a resilient flexible annular member attached to said rigid annular member along said inner circumference thereof,

said rigid annular member being adapted to be positioned around said circular base,

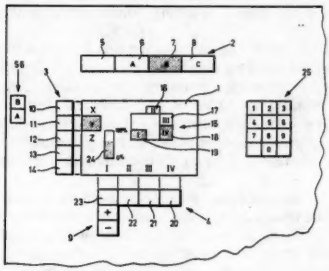
said resilient flexible annular member extending into said groove in a forced fit relationship when said rigid annular member is positioned around said circular base whereby said resilient flexible member will stretch said article of apparel uniformly over said top face of said circular base and engage said article of apparel in said groove in said side face holding said article of apparel securely in position while said article of apparel is printed.

4,998,472

DEVICE FOR CONTROLLING A PRINTING MACHINE

Anton Rodi, Leimen; Dieter Hauck, Eberbach; Michael Lehnert, Heidelberg, and Manfred Jurkewitz, Wiesloch, all of Fed. Rep. of Germany, assignors to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

Continuation of Ser. No. 202,738, Jun. 3, 1988, abandoned. This application Jul. 23, 1990, Ser. No. 560,234
Claims priority, application Fed. Rep. of Germany, Jun. 3, 1987, 3718594
Int. Cl.[5] B41F *33/16*
U.S. Cl. 101—216 **13 Claims**



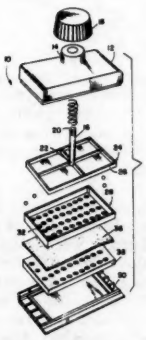
1. Device for controlling substantially all of the functions of a printing machine having controls for inputting commands, and a display device for displaying a status, comprising at least two groups of the controls including a first group of controls having a fixed assignment to freely selective units of the printing machine, a second group of controls selectively assigned to controlling components of a respectively selected unit of said selective units of the printing machine, a third group of controls for inputting at least one set of commands selected from the group consisting of switching commands and adjusting commands for triggering a function in said controlling components of said respectively selected unit of the printing machine, the display device having means for displaying in graphic symbols said selective assignment of said second group of controls to at least one of given components and functions of the printing machine.

4,998,473

RANDOM DATA LOTTO PRINTER AND METHOD FOR ITS MANUFACTURE

Rene Laureyns, 153 E. 32nd Street, New York, N.Y. 10016

Filed Dec. 12, 1988, Ser. No. 283,124
Int. Cl.[5] B41K *1/42*
U.S. Cl. 101—333 **4 Claims**



1. A random data and lotto printer apparatus comprising:

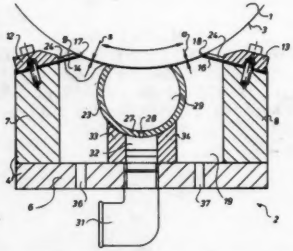
a first grid having a plurality of holes,
said first grid having an upstanding wall means surrounding said plurality of holes,
a flat plate means adapted and constructed to reciprocatingly slide within said wall means,
said flat plate means, said wall means and said first grid together defining a variable volume space,
said variable volume space containing a plurality of balls the diameter of which being larger than the said holes of said grid,
said grid and said balls being relatively dimensioned whereby a portion of the said balls projects through the holes in which they may reside,
a moist inked imprint pad external of said variable space and having one side in touching confrontation with said first grid,
said moist inked pad on its other side having a plurality of integral extending members,
a second grid having a plurality of holes axially aligned with the plurality of holes in said first grid and having the integral extending members extending therethrough and the integral extending members being in elongated dimension substantially equal to the dimension of the second grid,
retaining and aligning means for holding a to-be-printed surface means against the second grid whereby the apparatus may selectively imprint the surface means in response to the position of the balls on the first grid in said variable space when said plate means is reciprocatingly slid towards the first grid in impingement of said balls thereby selectively thrusting the integral extending members in the direction of the to-be-printed surface.

4,998,474

FLUSH INKING UNIT

Horst-Walter Hauer, Wurzburg, Fed. Rep. of Germany, assignor to Koenig & Bauer Aktiengesellschaft, Wurzburg, Fed. Rep. of Germany

Filed Mar. 27, 1990, Ser. No. 499,724
Claims priority, application Fed. Rep. of Germany, Apr. 11, 1989, 3911836
Int. Cl.[5] B41F *31/08*
U.S. Cl. 101—366 **5 Claims**



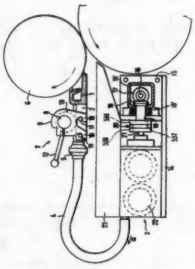
1. A flush inking unit useable to supply printing ink to a peripheral surface of an ink fountain roller of a web fed rotary printing machine, said flush inking unit comprising:
an inking unit housing having a base plate, spaced front and rear walls and spaced first and second side covers, said first and second side covers each having an upper surface which is shaped to cooperate with, and to conform with, a peripheral surface of an ink fountain roller and which is spaced from a peripheral surface of an ink fountain roller to define a small gap between said upper surfaces of said first and second side covers of said inking unit housing and a peripheral surface of an ink fountain roller, said inking unit housing defining a closed ink space;
an inking groove positioned in said closed ink space defined by said inking unit housing, said inking groove having first and second ink dividing plates, said first and second ink dividing plates being spaced from, and generally parallel to said first and second side covers, said first and second ink dividing plates each having an upper surface which is shaped to cooperate with, and to conform with a peripheral surface of an ink fountain roller and which is spaced from a peripheral surface of an ink fountain roller to define a small gap between said upper surfaces of said first and second ink dividing plates and a peripheral surface of an ink fountain roller, said inking groove defining an ink space, said ink space being positioned within said closed ink space; and
means for supplying printing ink to said inking groove and for maintaining said printing ink in said inking groove at a first pressure which is higher than a second pressure maintained in said closed ink space.

4,998,475

COMPACT PRINTING MACHINE INKER SYSTEM

Thomas John; Georg Bock; Rainer Burger, all of Augsburg, and Franz X. Gollinger, Hirschbach, all of Fed. Rep. of Germany, assignors to Man Roland Druckmaschinen AG, Offenbach am Main, Fed. Rep. of Germany

Filed Sep. 6, 1989, Ser. No. 403,754
Claims priority, application Fed. Rep. of Germany, Sep. 22, 1988, 3832148; Sep. 22, 1988, 3832183
Int. Cl.[5] B41F *31/08, 27/10*
U.S. Cl. 101—366 **26 Claims**

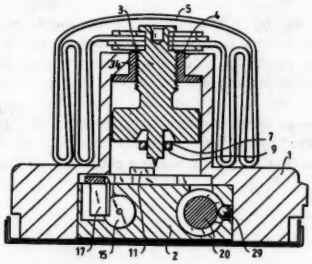


1. Printing machine inker to supply ink to an ink accepting roller (6) having
means (1, 7) for applying ink to the ink accepting roller;
a primary ink supply (3), a connecting line (4) coupling the primary ink supply (3) to the ink applying means (7, 1) and comprising
a secondary ink supply (24, 40) having an ink capacity substantially less than the ink capacity of the primary ink supply;
means (27–30; 29–46) for applying pressure to ink in said secondary ink supply;
a releasable coupling connection (5) connected to said ink applying means (7, 1) and selectively connectable to said secondary ink supply (24, 40) or to said connecting line (4) from said primary ink supply (3);
and wherein said means (7, 1) for applying the ink to said ink accepting roller (6) comprises
a chambered doctor blade unit (1, 510) defining an ink retention chamber; and
wherein said ink retention chamber is in fluid communication (26) with said releasable coupling connection (5) for selectively connecting ink from said primary ink supply (3) through said connecting line (4) or from said secondary ink supply (24, 40) to the ink retention chamber of said chambered doctor blade unit (1, 510).

4,998,476
FUZE FOR A BOMBLET

Werner Rüdenauer, Roth; Fritz Müller, Nuremberg, and Joachim Furtmayr, Erlangen, all of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nuremberg, Fed. Rep. of Germany

Filed Apr. 3, 1990, Ser. No. 503,874
Claims priority, application Fed. Rep. of Germany, Apr. 18, 1989, 3912671
Int. Cl.[5] F42C 9/06, 9/16
U.S. Cl. 102—226 6 Claims

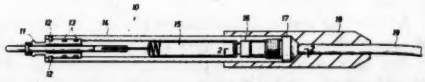


1. Fuze for a bomblet including a slider; a detonator for an impact detonation being arranged in the slider so as to undergo a transition from a secured position into an armed position during the free flight of the bomblet; a hydraulic or pneumatic cylinder-piston retarding device; a spring-biased self-destruct pin in said slider; a lever which is pivotably supported on said slider coupling said self-destruct pin with the retarding device; a self-destruct detonator being operatively associated with the self-destruct pin, said retarding device being blocked until the slider is generally located in the armed position thereof, said retarding device in the armed position of the slider braking the movement of the self-destruct pin during a self-destruct period and thereafter, said lever releasing said self-destruct pin upon a pivoting of said lever in correlation with said self-destruct period.

4,998,477
DETONATION TRANSFER APPARATUS FOR INITIATING DETONATION OF AN INSENSITIVE DETONATING CORD UTILIZING AN INITIATING COMPOUND, FLYER AND SHOCK REFLECTOR

James M. Barker, Katy, Tex., assignor to Halliburton Logging Services, Inc., Houston, Tex.

Filed Feb. 14, 1990, Ser. No. 480,195
Int. Cl.[5] F42C 19/12; F42B 19/08; F42D 1/04
U.S. Cl. 102—275.6 13 Claims



1. An explosive initiator for well borehole use in high temperature and pressure wells where explosive train components come into direct contact with well borehole fluid comprising:

(a) a generally elongated cylindrically shaped housing member having a bore therethrough, and having an upper end and a lower end, said bore having a shoulder in the lower end of said housing member;

(b) an electrical conductor feedthrough connector entering said bore at said upper end of said housing member cooperative with a hermetic seal therebetween;

(c) sleeve means

(1) having a generally cylindrical shape with

(2) a transverse bulkhead thereacross with

(3) a plurality of recessed cavities in said bulkhead for holding plural pellets of secondary explosive at the upper surface of said bulkhead, said bulkhead having upper and lower faces shaped for directing shock waves toward a common region along the axis of the sleeve means

(4) chamber means at the lower surface of said bulkhead for holding a specified quantity of initiating compound therein for detonation of transfer of a shock wave across said bulkhead, said sleeve means also having

(5) an elongate encircling skirt portion extending from said bulkhead,

(6) said skirt portion being sized to fit within said housing member between one end thereof and said shoulder,

(7) said skirt portion receiving a terminal end of a detonating cord therein for fixed attachment in said housing member;

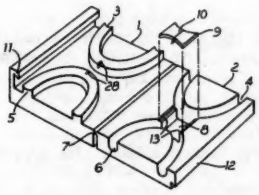
(d) skirt crimping means cooperatively joining said sleeve means to the detonating cord therein to position the terminal end thereof for detonation wherein detonation first involves said secondary explosive forming a detonation shock wave crossing said bulkhead to said initiating compound and the terminal end of the detonating cord,

(e) an external, encircling, concentrically mounted boot at the lower end of said housing member that seals against fluid intrusion.

4,998,478
CONNECTION DEVICE FOR BLASTING SIGNAL TRANSMISSION TUBING

Michael W. Beck, Ayrshire, England, assignor to Imperial Chemical Industries plc, London, England

Filed Mar. 1, 1990, Ser. No. 485,872
Claims priority, application United Kingdom, Mar. 1, 1989, 8904660
Int. Cl.[5] C06C 5/04
U.S. Cl. 102—275.7 26 Claims



1. A blasting signal transmission tube connector comprising a housing adapted to enclose a portion of a first length of transmission tube and a portion of a second length of transmission tube, and including retaining means for retaining said portions adjacent one another, each in a predetermined arcuate configuration such that the apexes of said arcs face one another and whereby an aperture formed in each of said tube portions at a position corresponding to said apexes enables a portion of a blasting signal travelling along said first length of transmission tube to exit said first length via the aperture formed therein and to enter said second length of transmission tube via the aperture formed therein, thereby initiating a blasting signal in said second length.

4,998,479
SMOKE GENERATING DEVICE WITH RECHARGABLE CARTRIDGE

William J. Perham, 1603 Morganton Rd., Fayetteville, N.C. 28305, and Daniel Watlington, Rte. 10, Box 114, Fayetteville, N.C. 28301

Filed Jun. 15, 1988, Ser. No. 206,883
Int. Cl.[5] C06D 3/00; F42B 13/44; A01M 13/00; C09K 3/30
U.S. Cl. 102—334 10 Claims

1. A smoke generating apparatus comprising: a housing; a rechargable cartridge containing a vaporizable, smoke produc-

ing solution under pressure, said cartridge including a discharge opening and a one-way flap type seal which is urged to a closed position by the pressurized contents of the cartridge; means for securing said cartridge to said housing; valve means mounted in said housing and having an intake and a discharge outlet; a feed tube connected at one end to the intake of said valve means and extending from said housing, the feed tube being adapted for insertion through the one-way seal in the cartridge when the cartridge is attached to the housing; a vaporizor coil mounted in the housing and including an inlet end connected to the discharge outlet of the valve means and a discharge end, the vaporizer coil being adapted to vaporize the smoke producing liquid therein; a smoke discharge nozzle connected to the discharge end of the vaporizer coil for discharging the vaporized solution from the vaporizer coil; means for heating the smoke producing liquid as the same flows through the vaporizer coil to vaporize the smoke producing liquid; and means for actuating the valve means to introduce the contents of the rechargable cartridge into the vaporizer coil.

9. A method for producing smoke comprising: filling a rechargable cartridge having a one-way seal with a vaporizable, smoke producing solution; pressurizing the contents of the cartridge; coupling the cartridge to a smoke generating device including a feed tube operatively connected to the intake of a valve means, a vaporizer coil having an inlet operatively connected to the discharge outlet of the valve means and a discharge end operatively connected to a smoke discharge nozzle, the step of coupling the cartridge to the smoke generating device including inserting the feed tube through the seal in the cartridge so that the contents of the cartridge are supplied to the valve means; actuating the valve means to direct the flow of smoke producing solution through the vaporizer coil; heating the vaporizer coil as the smoke producing solution flows therethrough to vaporize the solution; and discharging the vaporized solution through a smoke discharge nozzle operatively connected to the vaporizer coil.

4,998,480

PNEUMATIC UNLOCKING DEVICE FOR MUNITIONS RELEASABLE FROM A CARRIER

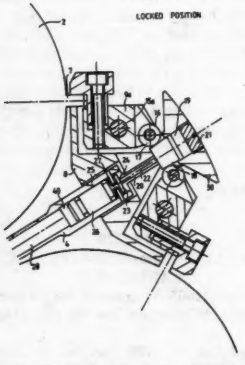
Jean F. Denis, Checy; Alain Lepicard, rue Royale, and Henri Ropars, Place du Val, all of France, assignors to Thomson-Brandt Armements, Boulogne Billancourt, France

Filed Jan. 8, 1990, Ser. No. 461,681

Claims priority, application France, Jan. 17, 1989, 89 00483

Int. Cl.[5] F42B *13/50*

U.S. Cl. 102—393 **4 Claims**



1. A device for the unlocking of a fixing system holding sub-munitions on board a carrier, said sub-munitions comprising supports, said fixing system comprising a movable holding clamp rotatable around a shaft fixed in relation with edges of said carrier, said carrier comprising a gas generator and several compartments, each of said compartments comprising one sub-munition, said compartment being delimited by said edges, each of said edges including a conduit connected to the gas generator and an upper end comprising a cavity, said device comprising:

a piston positioned in the conduit connected to said gas generator;

a rod comprising a first part connected to a second step part which is wider than the first part, the first part being supported by the piston and the second step part being lightly engaged in the cavity;

wherein an end of the holding clamp comes into bearing against the step part of the rod, and wherein the gases of the gas generator produce a pressure which acts on the piston, the piston has a translational motion which drives the rod, the second step part gets engaged completely in the cavity enabling the end of the holding clamp to be supported by the first part, the translational motion allowing the rotation of the holding claim around the shaft.

4,998,481

RETURNING SYSTEM FOR RAIL-BOUND TRANSPORT CARTS WITHOUT INTERNAL DRIVE

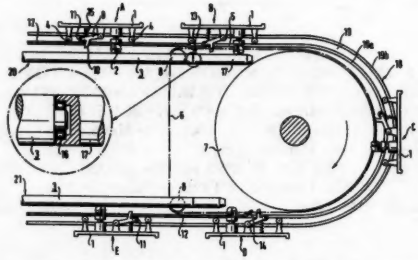
Erwin Grimm; Christian Koch; Volker Häusler; Helmut Pfenning, and Hubert Christ, all of Mainz, Fed. Rep. of Germany, assignors to Schott Glaswerke, Mainz, Fed. Rep. of Germany

Continuation of Ser. No. 164,950, Mar. 7, 1988, abandoned. This application Aug. 17, 1990, Ser. No. 569,245

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1987, 3707395; Feb. 13, 1988, 3804593

Int. Cl.[5] B61B *13/12*

U.S. Cl. 104—166 **24 Claims**



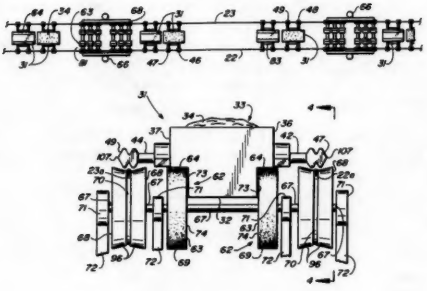
1. A returning system comprising: a plurality of separate, continuously disconnected and spaced apart rail-bound transport cars, each having at least a pair of support rollers spaced from one another on separate axes without internal drives, which are moved on a transport line by a common main drive system, wherein a separate secondary drive system is provided in an end area of the transport line to transfer the transport cars via a vertical curve to a return line extending substantially parallel with and beneath the transport line and having a starting area adjacent the secondary drive system, the return line being provided with a second main drive system, the second main drive system including means for transferring the transport carts on, the return line (21) in an inverted position; the secondary drive system comprising a circulating drive means (6) which is guided parallel to rails (5) of the transport line over a substantial portion of the rails and the return line in the end area of the transport line (20) and in the starting area of the return line (21) respectively.

4,998,482

AERIAL TRAMWAY AND METHOD FOR RELIEVING INDUCED TORQUE

Jan K. Kunczynski, Glenbrook, Nev., assignor to Zygmunt A. Kunczynski and Alexander J. Kunczynski, both of Carson City, Nev.

Filed Jan. 26, 1990, Ser. No. 470,864
Int. Cl.[5] B61B 7/04
U.S. Cl. 104—178 43 Claims



1. In an aerial tramway having a pair of side-by-side, substantially parallel, movable haul ropes extending over a course; and at least one load carrying unit attached to both said haul ropes for advancement with said haul ropes; the improvement in said aerial tramway comprising:

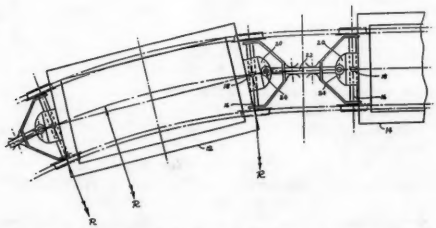
a plurality of detachment means positioned periodically along said course, said detachment means formed for and cooperating with said load carrying means to effect detaching of said load carrier unit from at least one of said haul ropes sufficiently to relieve torque induced in said load carrying unit due to differences in haul rope speeds.

4,998,483

BOGIE STEERING SYSTEM

Petrus D. Prins, Safarituine, South Africa, assignor to Goldfieds Engineering (Proprietary) Limited, Odendaalsrus, South Africa

Filed Mar. 31, 1989, Ser. No. 331,373
Int. Cl.[5] B61D 17/00
U.S. Cl. 105—3 8 Claims



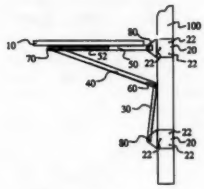
1. A bogie system which includes first and second wheeled axles which are pivotal about respective vertical axes, drawbar means connected at opposed ends to respective pivot points associated with the first and second axles respectively, and control devices which are engaged with each respective axle and the drawbar means and which permit movement of each axle about its respective vertical axis and the respective said pivot point.

4,998,484

VERSATILE WALL MOUNT FOLDING TABLE

Charles R. Groetzinger, Racine, Wis., assignor to Niche Design, Inc., Racine, Wis.

Filed Sep. 11, 1989, Ser. No. 405,511
Int. Cl.[5] A47B 23/00
U.S. Cl. 108—42 20 Claims



1. A folding wall-mounted table configured to lie in a generally vertical position when in a lowered state and having means for selectively positioning said table in either a horizontal or forward sloping state when said table is rotated upward to a locked position, by positioning respective wall mounting brackets to various vertical distances, said table comprising;

four wall mountable support brackets formed at a ninety degree angle with respect to, and adapted to be secured with fasteners to, a generally vertical wall, with two of said wall brackets being mounted vertical to one another at a pre-determined distance and the second set of said wall brackets being mounted at a pre-determined distance to one another, and spaced apart from said first set of wall brackets and;

a rigid, generally planar table surface with;

two slotted channels fastened to said table, adapted to pivotally connect to two upper said wall support brackets for rear support thereof, and;

a first and second set of support arms comprised of an upper support channel and a lower support channel, pivotally connected to one another, with said upper support channel having the means to slide and pivotally connect to said slotted channel mounted to said table and the lower support channel having the means to pivotally attach to the lower set of said wall support brackets

said lower support channel being received against said vertical wall when said table is rotated upward and said upper support channel pivotally slides down said slotted channel in a forward direction and said upper support channel and said lower support channel are rotated inward.

4,998,485

METHOD OF DISPOSING OF AND APPARATUS FOR GRINDING MOISTURE BEARING WASTE MATERIAL AND USING HEAT FROM BURNING WASTE MATERIAL TO REDUCE MOISTURE CONTENT THEREOF

Robert M. Williams, 16 La Hacienda, Ladue, Mo. 63124

Filed Aug. 1, 1990, Ser. No. 561,348
Int. Cl.[5] F23B 7/00
U.S. Cl. 110—234 6 Claims

1. In apparatus for disposing of waste material in an inert circulating system, the combination comprising:

(a) a grinding mill having inlet means for receiving waste material and a circulating medium inlet and an outlet for ground particulate waste material with said circulating medium;

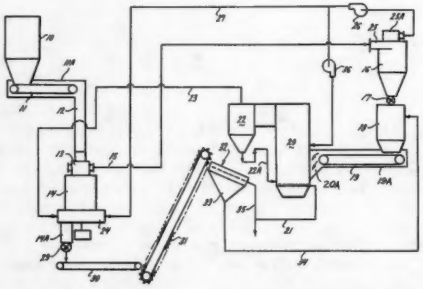
(b) a boiler having inlet means for receiving ground particulate waste material and circulating fluid medium, and an outlet for hot inert circulating fluid medium;

(c) first circuit means containing means to receive from said grinding mill outlet the ground particulate waste material together with circulating medium and means to effect separation of said ground particulate waste material from

said circulating medium, and having an outlet from said means to effect said separation for the circulating medium connected to said grinding mill circulating medium inlet means;

(d) other circuit means containing said boiler, and having an outlet connected to said grinding mill circulating medium inlet means, said other circuit means having a connection to said first circuit means which extends to said boiler inlet means;

(e) feed means connected from said means to effect separation of said ground particulate waste material to said boiler inlet means to supply dried and ground particulate



waste material to said boiler to facilitate combustion in said boiler;

(f) means to supply moist waste material to said grinding mill inlet means which introduces moisture to the system; and

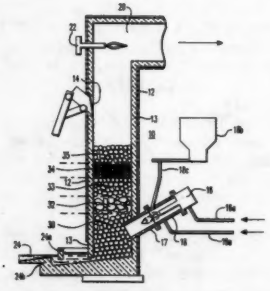
(g) blower means in each of said first and other circuit means for moving hot inert circulating medium from said boiler to said grinding mill to effect drying of said moist waste material and to withdraw circulating medium from said first circuit means to said boiler to maintain the inert condition of said hot inert circulating fluid medium and to move the evaporated moisture back to the boiler thereby assuring no energy loss.

4,998,486

PROCESS AND APPARATUS FOR TREATMENT OF EXCAVATED LANDFILL MATERIAL IN A PLASMA FIRED CUPOLA

Shyam V. Dighe, North Huntingdon; Raymond F. Taylor, Jr., Irwin; Robert J. Steffen, Whitehall, and David M. Rohaus, Jeannette, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Apr. 27, 1989, Ser. No. 343,694
Int. Cl.[5] F23G *5/00, 5/12*
U.S. Cl. 110—346 **28 Claims**



1. A process for treatment of excavated landfill material contaminated with toxic and hazardous substances comprising:

providing a plasma-fired cupola having a vertical shaft cupola with an upwardly located charge door and a plasma torch located proximate the bottom of said cupola;

heating air to a high temperature by said plasma torch and supplying the heated air into said cupola;

forming a bed of carbonaceous fuel in said cupola heated to combustion by the heated air;

supplying excavated landfill material and reactive agents through said charge door of said cupola, said reactive agents comprising additional carbonaceous fuel;

melting the excavated landfill material in the cupola to form a vitreous slag;

tapping the cupola to take out vitreous slag;

drawing off-gases from said cupola to an afterburner for destruction of any volatile toxic and hazardous materials contained in the off-gas;

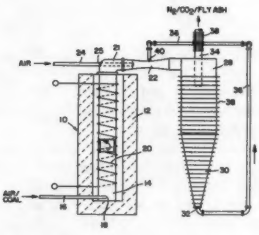
allowing vitreous slag from the cupola to cool and produce non-hazardous solid material.

4,998,487

NOVEL COAL COMBUSTION METHOD

Charles H. Winter, Jr., Suite 802, 1301 N. Harrison St., Wilmington, Del. 19806

Filed Jul. 9, 1990, Ser. No. 549,924
Int. Cl.[5] F23D *1/00*
U.S. Cl. 110—347 **10 Claims**



1. A process for burning coal to recover the heat values contained therein comprising:

tangentially injecting air and granulated coal into a first tubular reactor for partial combustion, said air being less than the amount of air required for complete combustion of said granulated coal, and heating said air and coal initially with external heat to a temperature 50 to 100 degrees Farenheit below the ash fusion temperature of the ash produced during said combustion and thereafter using insulation to maintain said heat, to produce a partial combustion mixture of coke, ash and combustion gases, and removing said partial mixture.

4,998,488

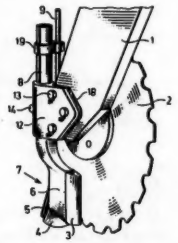
AGRICULTURAL COMBINED DRILL DISPENSER

Kurt Hansson, Norrbäck, S-73300 Sala, Sweden

PCT No. PCT/SE88/00073, § 371 Date Oct. 16, 1989, § 102(e) Date Oct. 16, 1989, PCT Pub. No. WO88/05997, PCT Pub. Date Aug. 25, 1988
PCT Filed Feb. 19, 1988, Ser. No. 424,209
Claims priority, application Sweden, Feb. 19, 1987, 8700681
Int. Cl.[5] A01C *7/06, 5/08;* A01B *49/06*
U.S. Cl. 111—187 **7 Claims**

1. A combination agricultural apparatus for substantially simultaneously cutting into the soil and implanting seeds and fertilizer and which is mounted to a coulter arm comprising, a cutting means mounted to the coulter arm for forming a cut in the soil, a first discharge means for discharging seeds into the soil, a clamp means for vertically adjustably mounting said first discharge means to the coulter arm so as to be adjacent said cutting means, first adjustable means for securing said clamp

means to the coulter arm and second adjustable means for securing said first discharge means to said clamp means, a second discharge means for discharging fertilizer into the soil, clip means for mounting said second discharge means relative to said first discharge means, said first discharge means having a lower end extending within the cut in the soil, said second discharge means being adjacent to said cutting means and said first discharge means and having a lower end which is horizontally spaced relative to said lower end of said first discharge means, said first adjustable means including an elastomeric



element mounted between said clamp means and the coulter arm and a plurality of adjustable bolts extending through said clamp means and said elastomeric element and into the coulter arm, said bolts being selectively adjustable to compress the elastomeric element to thereby laterally deflect said first discharge means with respect to the coulter arm, whereby said lower ends of said first and second discharge means may be selectively vertically adjusted relative to one another within the cut in the soil so that the fertilizer may be deposited substantially simultaneously with the seed but at different depths within the soil.

4,998,489

EMBROIDERING MACHINES HAVING GRAPHIC INPUT MEANS

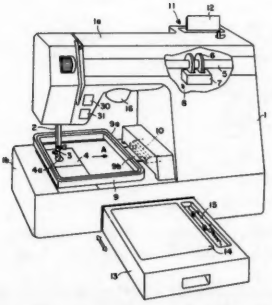
Michio Hisatake; Takeshi Kongo; Hidenori Sasako, and Yoshikazu Ebata, all of Tokyo, Japan, assignors to Janome Sewing Machine Industry Co., Ltd., Tokyo, Japan

Filed Apr. 28, 1989, Ser. No. 345,613

Claims priority, application Japan, Apr. 28, 1988, 63-104043

Int. Cl.[5] D05C *9/04;* D05B *21/00*

U.S. Cl. 112—103 **4 Claims**



3. In an embroidering machine having a machine housing, a vertically reciprocated needle supported by the machine housing and carrying a thread, a thread loop-taker cooperating with the needle to form a stitch on a fabric, an embroidery frame for supporting the fabric, means for shifting the embroidery frame with respect to the needle, and memory means for storing embroidery stitch control data for a plurality of patterns including character patterns, the data being selectively and sequentially read out from the memory means to drive the frame shifting means to thereby produce stitches of a selected pattern, the improvement which further comprises;

an image input frame having a configuration corresponding to the embroidery frame and replaceable therewith, but designed to carry a picture desired to be embroidered on the fabric in the embroidery frame;

camera means mounted on the machine housing in opposition to said image input frame attached to the machine housing for taking a photograph of the picture, said photograph representing relative position data between the picture and the needle;

a graphic display connected to the machine housing, for displaying thereon said relative position data between the picture and the needle and capable of reproducing a picture on the image input frame; and

signal generating means cooperating with said graphic display so that sufficient stitch boundary points to define curvature and bounds of the stitching for reproducing the picture on the fabric can be defined in terms of the coordinates of the display and therefore the embroidery frame.

4,998,490

BOBBIN HOUSING ASSEMBLY IN A SEWING MACHINE HAVING AT LEAST ONE HOOK

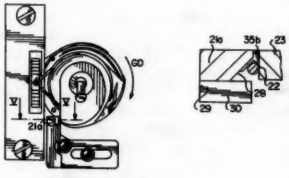
Hans R. Goebbels, Hiddenhausen; Kurt Biermann, Bielefeld; Gerhard Steppat, Bielefeld; Wilhelm Stapel, Bielefeld; Michael Rosemann, Bielefeld, and Klaus D. Seiler, Kirchlengern, all of Fed. Rep. of Germany, assignors to Durkoppwerke GmbH, Fed. Rep. of Germany

Continuation of Ser. No. 138,590, Dec. 28, 1987, abandoned. This application Jun. 2, 1989, Ser. No. 361,734

Claims priority, application Fed. Rep. of Germany, Dec. 30, 1986, 3644711

Int. Cl.[5] D05B *57/26, 57/08*

U.S. Cl. 112—231 **7 Claims**



1. A sewing machine, comprising:

base having a throat plate mounted therein;

a rotating hook mounted in the base below the throat plate for holding and looping a top thread in a looping direction, the hook enclosing a bobbin housing for accomodating a bottom thread;

a spring bar having a fixed end mounted in the base and having a free end for bearing against the bobbin housing; and said free end being displaceable by said top thread held in said hook; and

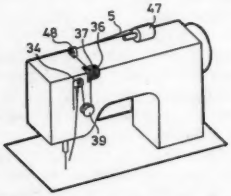
guide-and-stop means mounted in the base and including a cam surface for guiding movement of the free end of said spring element when displaced by said top thread and for engaging said free end and thereby stopping said movement of said free end when such movement has defined a predetermined displacement of said free end, whereby said movement of said free end is limited to prevent unwanted oscillation of said free end.

4,998,491

METHOD OF AUTOMATICALLY CONTROLLING UPPER THREAD TENSION IN A SEWING MACHINE

Susumu Hanyu; Noboru Kasuga; Kazumasa Hara, and Shuzo Morimoto, all of Tokyo, Japan, assignors to Janome Sewing Machine Co. Ltd., Tokyo, Japan

Filed Jun. 22, 1988, Ser. No. 209,856
Claims priority, application Japan, Jun. 26, 1987, 62-157622
Int. Cl.[5] D05B *49/00*
U.S. Cl. 112—262.1 1 Claim



1. A method of automatically controlling thread tension in a sewing machine comprising an upper thread source, a rotatable upper drive shaft, stitch forming means including a needle for carrying an upper thread supplied from the upper thread source, operatively connected with the upper drive shaft, and movable in vertical and lateral directions in synchronism with rotation of the upper drive shaft, a loop-taker for carrying a lower thread, operatively connected with the upper drive shaft, and rotatable in synchronism with the upper drive shaft for catching the upper thread and interlocking the upper thread with lower thread to form, in cooperation with the needle, a stitch, and a thread take-up lever operatively connected with the upper drive shaft and movable vertically downward to supply the upper thread to the needle, and upward to tighten the stitch, said method comprising the steps of:

providing a first thread tension device between the upper thread source and the thread take-up lever and operating said first thread tension device to apply a constant pressure to the upper thread such that the thread take-up lever is able to draw out the upper thread upon moving upward;

providing a second thread tension device between said first tension device and the thread take-up lever and operating said second thread tension device to fixedly hold the upper thread during movement of the thread take-up lever upward to an upper dead point thereof from a lower dead point thereof and during a downward movement of the take-up lever from a position adjacent to the upper dead point thereof to supply the upper thread to the needle; and

operating said second thread tension device to effect release of the upper thread at a time when the thread take-up lever reaches the upper dead point thereof and until a time when the thread take-up lever starts said downward movement to supply the upper thread to the needle.

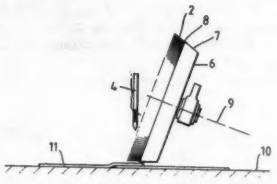
4,998,492

METHOD OF AND APPARATUS FOR REDUCING PUCKERING OCCURRING IN A LINE OF MACHINE STITCHING DURING THE STITCHING OPERATION

John Aitken, and John Fletcher, both of Paisley, Scotland, assignors to J. & P. Coats, Limited, Scotland

PCT No. PCT/GB89/00435, § 371 Date Dec. 28, 1989, § 102(e) Date Dec. 28, 1989, PCT Pub. No. WO89/10442, PCT Pub. Date Nov. 2, 1989
PCT Filed Apr. 24, 1989, Ser. No. 438,400
Claims priority, application United Kingdom, Apr. 29, 1988, 8810313
Int. Cl.[5] D05B *27/00, 47/00, 35/08, 47/00*
U.S. Cl. 112—303 8 Claims

1. Apparatus for forming on a work piece a line of stitching substantially free from puckering by placing a stitch-engaging element of a width less than the length of a stitch to project across the line of stitching at the sewing position of a sewing machine having a needle said stitch-engaging element comprising a number of flexible filamentary elements arranged side by side in close juxtaposition as an endless row of stitch-engaging



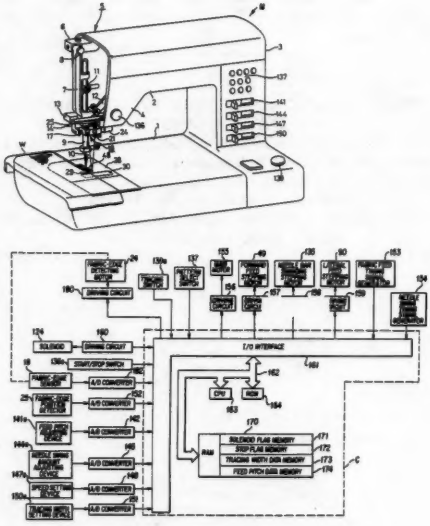
elements movable in a direction longitudinally of the row of stitch-engaging elements and positioned so that a portion of the row of stitch-engaging elements projects across the line of stitching at the sewing position.

4,998,493

EDGE TRACING SEWING MACHINE

Takafumi Tanaka, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed May 24, 1990, Ser. No. 527,878
Claims priority, application Japan, Jul. 25, 1989, 1-193210
Int. Cl.[5] D05B *3/02*
U.S. Cl. 112—453 11 Claims



3. An edge tracing sewing machine comprising:

a reciprocable needle bar having a needle at a lower end thereof;

feeding means for feeding a workpiece in a sewing direction;

relative position changing means for changing relative position between the needle and the workpiece in a lateral direction perpendicular to the sewing direction;

tracing width setting means for setting a tracing width from the edge of the workpiece to the needle in the lateral direction;

edge detecting means movable in the lateral direction for detecting an edge of the workpiece;

first control means for moving said edge detecting means in the lateral direction to a position to detect the edge of the workpiece;

position detecting means for detecting a position of said edge detecting means;

second control means for controlling said relative position changing means based on the tracing width set by said tracing width setting means and the position of said edge detecting means detected by said position detecting means; and

third control means for stopping a reciprocation of said needle bar and a feeding operation of said feeding means while said edge detecting means is moved by said first control means.

4,998,494

DEVICE FOR ENHANCING THE BUOYANCY OF SAILBOARDS AND THE LIKE

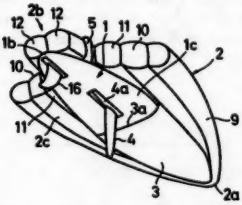
Reinhard Deutsch, wohnhaft in Gräfstrasse 47, D-6000 Frankfurt/Main, Fed. Rep. of Germany

Filed Feb. 2, 1990, Ser. No. 474,513

Claims priority, application Fed. Rep. of Germany, Feb. 15, 1989, 3904540

Int. Cl.[5] B63H *9/08*

U.S. Cl. 114—39.2 **23 Claims**



1. A device for enhancing the buoyancy of a sailboard of the type having a bow portion, a stern portion and a predetermined width, said device comprising an inflatable and collapsible hull having a bow, a stern, a width exceeding said predetermined width, an underside and a pocket at said underside for at least the bow portion of the sailboard, said pocket having a front portion at said bow and having a capacity such as to retain the bow portion of the sailboard in response to inflation of the hull.

4,998,495

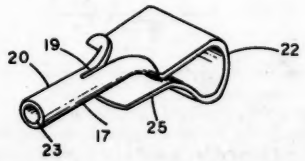
FENDER HANGER

William J. Bos, 2433 Byron Center Rd. #211, Wyoming, Mich. 49509, and John H. Bos, 5444 Eastern, SE., Kentwood, Mich. 49508

Filed Mar. 31, 1989, Ser. No. 332,300

Int. Cl.[5] A44B *13/00*

U.S. Cl. 114—218 **3 Claims**



1. A method of manufacturing a line-securing device, comprising:

slitting a piece of tubing of formable material along at least a portion of its length;

opening and flattening the end of said slit portion, producing a converging configuration at the end of said tubular portion; and

forming said flattened end into a hook.

4,998,496

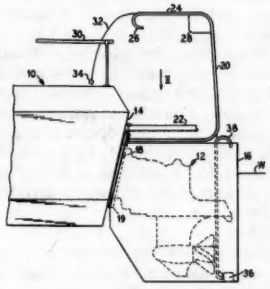
SHROUD FOR MARINE PROPULSION SYSTEM

Herbert R. Shaw, III, 3625 Blue Gill Ct., Morris, Ill. 60450

Filed Jul. 13, 1989, Ser. No. 379,273

Int. Cl.[5] B63B *59/00*

U.S. Cl. 114—222 **16 Claims**



1. A shroud for an outboard portion extending from a transom of a boat of an inboard/outboard marine propulsion system mounted in the boat, comprising:

a shroud body having water-tight walls and an opening for accepting an outboard portion of an inboard/outboard propulsion system;

means for sealing said opening of said shroud body on the transom of the boat about the outboard portion when in a sealing position, said means for sealing comprises a sealing channel spaced from the transom when in the sealing position; and

means for selectively fastening said shroud body in said sealing position.

4,998,497

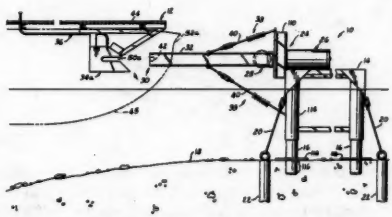
MOORING SYSTEM FOR VESSELS

Gregory J. Nelson, Milford, and Frederick G. Phelps, Saline, both of Mich., assignors to Gregory J. Nelson, Milford, Mich.

Filed Jun. 30, 1989, Ser. No. 375,060

Int. Cl.[5] B63B *21/00*

U.S. Cl. 114—230 **19 Claims**



8. A mooring system for a vessel, said mooring system comprising:

a dock for mooring vessels, said dock being locatable on a body of water bottom, said dock comprising:

a frame;

a plurality of legs connected with said frame;

a footing connected with each leg of said plurality of legs, each said footing having plate means connected with each said leg for providing a surface resistant to sinking into said body of water bottom; and

connection means for releasably connecting said frame to said body of water bottom;

a dock-side coupling member having a first end and a second end;

coupling interface means connected to said first end of said dock-side coupling member for selectively coupling said dock to said vessel;

two axes articulation means connected with said dock and said second end of said dock-side coupling member for permitting said dock-side coupling member to pivot and tilt with respect to said dock;

vessel-side coupling means connected with said vessel for selectively coupling with respect to said coupling interface means so as to couple said vessel to said dock; and

coupling release means for selectively releasing said coupling between said coupling interface means and said vessel-side coupling means. coupling member biasing means comprises a plurality of resilient cables connected between said dock and said dock-side coupling member, each said resilient cable supplying a biasing force on said dock-side coupling member so as to bias said dock-side coupling member to said predetermined orientation, each said resilient cable comprising:

a cable portion;

a resilient portion connected with said cable portion; and

turnbuckle means connected with one of said cable portion and said resilient portion for selectively adjusting said biasing force.

4,998,498

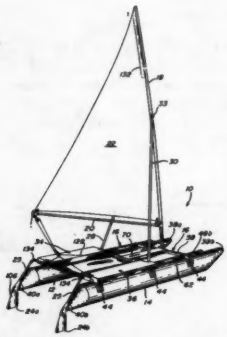
KNOCKDOWN SAILBOAT

Rejean Gallichan, Drummondville, Canada, assignor to Gallichan R. & Ass., Inc., Hull, Canada

Filed Jul. 7, 1989, Ser. No. 376,675

Int. Cl.[5] B63H *9/04*

U.S. Cl. 114—345 **14 Claims**



10. A knockdown multi-hull sailboat assembly consisting of a container formed by two identical container halves, at least a pair of elongated inflatable hull members adapted to form said multi-hull sailboat when inflated, longitudinal and lateral sectional tubular frame members adapted to be assembled to form a frame, anchor means within the container to be mounted on each hull member in order to receive and fix the frame to the hull members, a sectional mast adapted to be stepped on the frame, and a sectional boom connected to the mast, a center board, rudder means and rigging in the container halves are adapted to be mounted one on each of the at least two hull members and integrated to the frame to provide deck benches on the at least two hull members.

4,998,499

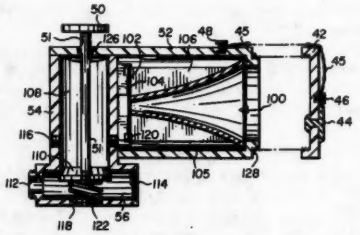
UNDERWATER PNEUMATIC HORN

Ellis L. Nordbeck, 327 Crooked Creek, Leonard, Mich. 48367

Filed Dec. 28, 1989, Ser. No. 458,503

Int. Cl.[5] G10K *9/00*

U.S. Cl. 116—142 FP **3 Claims**



1. An air actuated diaphragm horn for assembly with a scuba diver's equipment comprising a tank of compressed air adapted to be carried on a scuba diver's back, a buoyancy pressure compensating vest to permit the scuba diver to operate in water at varying depths, connecting means between the tank of compressed air and the buoyancy pressure compensating vest, an air actuated horn having an air chamber connected to said connecting means a valve controlling said connecting means, yielding means urging the valve towards a closed position, and a manually operable push button controlling the valve.

4,998,500

SQUEEGEE DEVICE

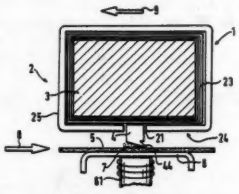
Johannes Zimmer, Ebentaler Strasse 133, 9020 Klagenfurt, Austria

Filed Jul. 13, 1989, Ser. No. 364,436

Claims priority, application European Pat. Off., Oct. 10, 1987, 87730126.7; Oct. 10, 1987, 87730128.3; Fed. Rep. of Germany, Oct. 10, 1987, 3734747; Oct. 10, 1987, 8713789; Oct. 10, 1987, 8713788

Int. Cl.[5] B05C *11/02*

U.S. Cl. 118—110 **22 Claims**



1. An apparatus for applying application material to a substrate comprising:

an abutment for supporting said substrate;

a squeegee device having a support body, magnetic means inside said support body, and a squeegee element made of a magnetizable material held onto the said support body by said magnetic means; and

said abutment being of a magnetically attractable material so that an attractive magnetic force is generated between said abutment and said squeegee device to press said squeegee element against said substrate.

4,998,501

TWIN VELOCITY LOCALIZED COLLECTION HEAD

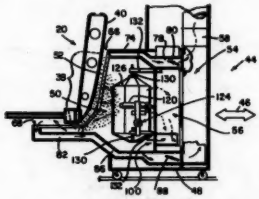
James C. Vogel, and Christopher R. Merritt, both of Indianapolis, Ind., assignors to Ransburg Corporation, Indianapolis, Ind.

PCT No. PCT/US88/03562, § 371 Date Nov. 13, 1989, § 102(e) Date Nov. 13, 1989, PCT Pub. No. WO89/04882, PCT Pub. Date Jun. 1, 1989

PCT Filed Oct. 13, 1988, Ser. No. 455,451

Int. Cl.[5] B05C *3/09*; B05B *15/04*

U.S. Cl. 118—312 15 Claims



1. Apparatus for applying a fusible granular precursor of a protective or decorative coating to the surface of an article, the apparatus comprising means for dispensing a stream of the fusible granular precursor in a stream of a bearing fluid, means for recovering fusible granular precursor that does not adhere to the surface of the article, means for mounting the dispensing means within the recovery means and means for coupling the recovery means to means for reclaiming fusible granular precursor recovered by the recovery means, the recovery means including a first manifold, means for establishing in the first manifold a subambient pressure, a second manifold, means for establishing in the second manifold a subambient pressure, means providing a first series of inlets, the inlets of the first series generally surrounding the dispensing means, means for coupling the means providing the first series of inlets to the first manifold, means providing a second series of inlets, and means for coupling the means providing inlets of the second series to the second manifold.

4,998,502

APPARATUS FOR TEMPERING FLUID MASSES

Josef Schucker, Straatsangehörigkeit, D-7530 Pforzheim, Fed. Rep. of Germany

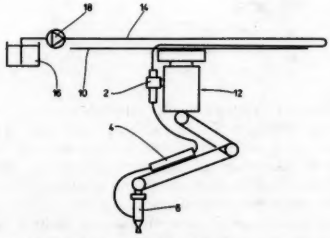
PCT No. PCT/EP87/00388, § 371 Date Jan. 23, 1989, § 102(e) Date Jan. 23, 1989, PCT Pub. No. WO88/00675, PCT Pub. Date Jan. 28, 1988

PCT Filed Jul. 17, 1987, Ser. No. 328,160

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1986, 3624844

Int. Cl.[5] B05C *11/10*

U.S. Cl. 118—667 30 Claims



5. A tempering apparatus for flowable masses

including a heat-exchange body of high thermal conductivity exhibiting a parallelepipedal solid body (26);

at least one broad-side face of the heat-exchange body is thermally connected with Peltier elements (28) and with boreholes disposed in the heat-exchange body;

wherein the boreholes are connected to a meander-shaped flow channel (24, 25) with an input opening (32) and a discharge opening (34);

wherein the flow channel comprises means for feeding it with high viscosity masses as fluids;

wherein the Peltier elements (28) are formed as combined heating and cooling aggregates, depending on the polarity of their connection terminals;

a sensor for measuring a value depending on the viscosity of the mass flow exiting from the tempering apparatus;

an automatic controller which is fed with the respective measurement value for controlling the Peltier elements (28), depending on the deviation from a predetermined set-point value.

4,998,503

APPARATUS FOR FORMING FUNCTIONAL DEPOSITED FILM BY MICROWAVE PLASMA CVD PROCESS

Tsutomu Murakami, Nagahama, and Masahiro Kanai, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

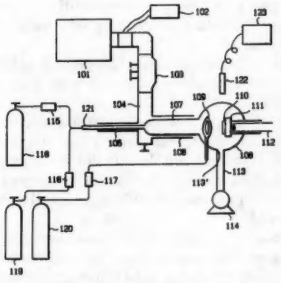
Continuation of Ser. No. 252,525, Oct. 3, 1988, Pat. No. 4,898,118. This application Nov. 2, 1989, Ser. No. 430,246

Claims priority, application Japan, Oct. 5, 1987, 62-249855

The portion of the term of this patent subsequent to Feb. 6, 2007, has been disclaimed.

Int. Cl.[5] C23C *16/48*

U.S. Cl. 118—723 2 Claims



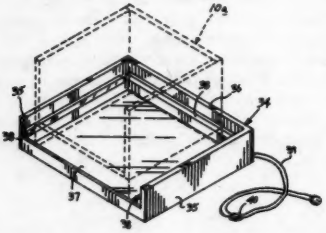
1. An apparatus for forming a deposited film by a microwave plasma CVD process comprising introducing a film-forming raw material gas into a reaction vessel capable of being vacuum sealed, and generating a microwave-excited plasma in the reaction vessel to deposit a film on a substrate for film deposition disposed in the reaction vessel, the apparatus comprising a waveguide for transmitting microwave energy, a pair of microwave cutoff cavities comprising a first microwave cutoff cavity and a second microwave cutoff cavity, said first and second microwave cutoff cavities (i) having different cutoff frequencies, and (ii) being disposed on opposite sides of the waveguide, and a reaction vessel disposed to penetrate through the waveguide and the first and second microwave cutoff cavities, wherein the first microwave cutoff cavity has a cutoff frequency f_1 greater than the cutoff frequency f_2 of the second microwave cutoff cavity, a raw material gas inlet being provided at the portion of the reaction vessel which penetrates through the first microwave cutoff cavity, and a film deposition space being provided at the portion of the reaction vessel which penetrates through the second microwave cutoff cavity.

4,998,504

DISPOSABLE PET LITTER BOX

Steven Ball, 1512 Courtney Oak, Knoxville, Tenn. 37938

Filed Feb. 26, 1990, Ser. No. 484,981
Int. Cl.[5] A01K *23/00*
U.S. Cl. 119—168 1 Claim



1. A disposable pet litter box comprising,

a container including a forward wall, a rear wall parallel to and coextensive with the forward wall, and

a right side wall and a left side wall wherein the left side wall and right side wall are arranged parallel to one another inter-communicatively connected with the forward wall and the rear wall, and

a floor underlying and orthogonally connected to the forward wall, rear wall, right side wall, and left side wall, and

a lid hingedly mounted to an upper edge of the rear wall, and coextensive with the rear wall, and

a right panel hingedly mounted to an upper edge of the right side wall and coextensive therewith, and

a left panel hingedly connected to and coextensively joined to an upper edge of the left side wall, the right panel and left panel of equal geometric configuration relative to one another, and

the right panel including a (rearwardly extending) right projection extending rearwardly of a rear edge of the right panel, and

the left panel including a left projection extending rearwardly and coextensively with a rear edge of the left panel, and

the lid including a right slot and a left slot receiving the right projection and the left projection therewithin, and

wherein the right slot and the left slot are arranged parallel to one another through the lid and positioned adjacent a respective right and left side edge of the lid medially thereof, and

further including a transparent container insert, the insert including spaced side walls, a forward wall, and a rear wall mounted to a floor, and a top panel mounted coextensively to upper edges of the walls, and the top panel including a continuous perforation spaced within the top panel spaced from the walls for removal of a central portion of the top panel, and the insert further including a predetermined quantity of absorbent litter contained therewithin, and

wherein the insert further includes an absorbent mat coextensively mounted overlying an interior surface of the floor of the insert, and the mat impregnated with a deodorant therethrough, and

wherein the right side wall, left side wall, floor, lid, right panel and left panel are each formed of a transparent polymeric material, and

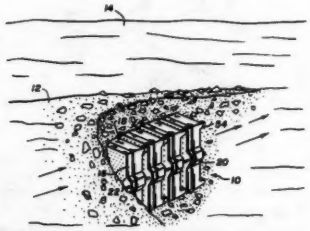
further including a sanitizing support container, the support container including support container side walls, and a support container rear wall, the support container side walls and the support container rear walls orthogonally mounted to an underlying support container floor, the support container floor defining an area greater than the area of the floor of the litter box, and each interior surface of each side wall and rear wall including an ultra-violet light emitting bulb mounted therealong, and the litter box mounted on the support container floor.

4,998,505

SALMONID EGG INCUBATOR

Fred P. Jordan, 3035 Newton Street, Nanaimo, British Columbia, Canada V9T 2Y2

Filed Sep. 1, 1989, Ser. No. 402,015
Claims priority, application Canada, Sep. 29, 1988, 578868
Int. Cl.[5] A01K *61/00*
U.S. Cl. 119—3 22 Claims



1. A salmonid egg incubator, comprising:

means defining a plurality of cells for containing salmonid eggs;

each of said cells being defined by walls which separate said cells from one another and which are dimensioned to retain, in each of said cells, an individual one of said salmonid eggs and an alevin hatched therefrom; and

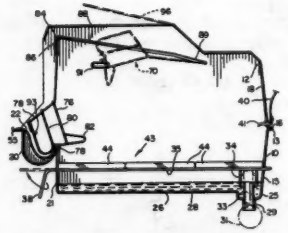
means defining in said walls of each of said cells an alevin outlet opening which is dimensioned to allow the respective alevin to escape through said opening only after said alevin has absorbed at least a major portion of its yolk sack, whereby said eggs and said alevins are separated from one another by said walls during the hatching of said eggs and until said alevins escape form said cells.

4,998,506

PIGGY DECK

Joseph R. Frostad, Box 331, Bentley, Alberta, Canada T0C 0J0

Filed May 23, 1988, Ser. No. 197,720
Int. Cl.[5] A01K *1/00*
U.S. Cl. 119—18 8 Claims



1. A housing for young animals comprising an upper unitary cover means having top, side and rear walls and having an open front, said walls being of solid material so as to eliminate unwanted air drafts therethrough, front gate means operationally attached to said cover means by tracks carried by an upper part of the cover means, said tracks slidably supporting said gate means for movement between a closed position blocking said open front and an open position in which the gate means is remote from said open front, a lower unitary base means connected to said cover means and having bottom, side and rear walls and front through means, excrement-pervious floor means supported in said base means above said bottom wall for

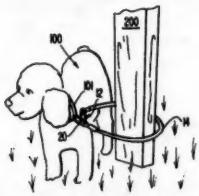
supporting an animal, said base means being formed of liquid-impervious material and configured such that water or other liquids can be selectively retained therein beneath said floor means, selectively operable drain means for draining said base means, said front through means being located above and in front of said floor means, and said gate means being configured to retain an animal in the housing while permitting feeding access of the animal to said trough means and preventing an animal from soiling the trough means.

4,998,507

TANGLE FREE LEASH APPARATUS

Joseph B. Browning, Rte. 2, Box 2367, Bandon, Oreg. 97411

Filed Feb. 8, 1990, Ser. No. 477,090
Int. Cl.[5] A01K *27/00*
U.S. Cl. 119—109 5 Claims



1. A tangle free leash apparatus for controlling animals wherein the leash apparatus comprises:

at least one elongated one-piece solid cylindrical leash segment fabricated from semi-rigid, yet flexible plastic material; having an elastic memory whereby the at least one leash segment may be resiliently deformed into a loop configuration which will then return to a straight configuration when relaxed; and, wherein the at least one leash segment comprises an elongated rod having its opposite ends provided with end cap members wherein each end cap member has a ring element rotatably disposed thereon; and

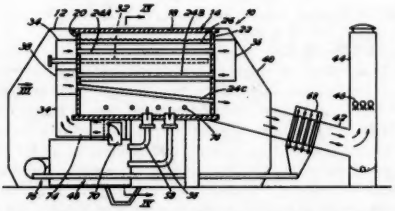
a linkage unit comprising an enlarged connecting link member adapted to join the ring elements on said at least one elongated leash segment.

4,998,508

CONDENSING TYPE BOILERS

Ronald Stead, Annan, Scotland, assignor to Northern Engineering Industries PLC, Newcastle upon Tyne, England

Filed May 16, 1989, Ser. No. 352,561
Claims priority, application United Kingdom, May 20, 1988, 8812021; May 20, 1988, 8812022
Int. Cl.[5] F23C *11/02*; F22B *31/04*
U.S. Cl. 122—4 D 1 Claim



1. A boiler comprising a shell for containing fluid to be heated, at least one baffle dividing said shell into first and second head exchange zones, the second zone having an upper region and the baffle having a lower end, said zones being in communication with one another beneath said lower end of the baffle, a combustion source external of the shell producing heat-containing gases, a plurality of tubes to which said heat-containing gases are supplied, the tubes extending through each zone in the heat exchange relationship with said fluid and being arranged in passes sequentially connected to one another whereby said gases pass sequentially through said first and second zones, and fluid feed means for feeding said fluid into the upper region of said second zone whereby the temperature of said gases passing through at least some of said tubes extending through said second zone can be reduced to below the dew points of combustion products contained in said gases, the orientation of tubes extending through said second zone in which condensation occurs being such that condensates flow therefrom for disposal,

said shell further comprising a hollow cylindrical body having a pair of opposed ends and a central longitudinal axis, said axis extending substantially horizontally, a pair of end plates closing respective ends of the body, and said tubes extending between, and being in sealed relationship with, said end plates, and

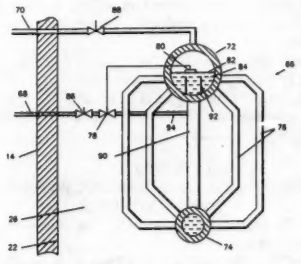
wherein the shell has an upper part, two baffles dividing said shell into said zones, said baffles extending axially of said shell body and depending from said upper part thereof one to each side of a vertical plane including the central longitudinal axis of said shell body, the baffles defining between them a space comprising said first zone and each baffle and the adjacent wall of said shell body defining between them respective spaces together comprising said second zone.

4,998,509

PASSIVE HEAT REMOVAL FROM CONTAINMENT

Perng-Fei Gou, Saratoga, and Harold E. Townsend, Campbell, both of Calif., assignors to General Electric Company, San Jose, Calif.

Division of Ser. No. 350,189, May 11, 1989, Pat. No. 4,950,448.
This application Mar. 28, 1990, Ser. No. 500,341
Int. Cl.[5] F22B *37/42*; F22D *5/08*
U.S. Cl. 122—504 4 Claims



1. A heat exchanger for removing heat from a suppression chamber of a nuclear reactor, comprising:

a top header;

a bottom header;

said top header and said bottom header being disposed a predetermined distance apart;

a plurality of heat-exchange tubes communicating between said top header and said bottom header;

means for metering a supply of coolant to said heat exchanger;

said means for metering including a float-controlled valve, thereby to maintain a predetermined level of said coolant in said heat exchanger;

said predetermined level being at an intermediate height in said top header, thereby providing a free surface area in said top header;

said free surface area being effective for permitting separation of a liquid and a vapor component of said coolant;

a downcomer;

said downcomer communicating between said top header

and said bottom header for return of liquid from said top header to said bottom header; and

means for encouraging a downward flow of liquid through said downcomer, said means for encouraging including

a channel in said top header;

said channel including first and second spaced-apart arms extending upward;

tops of said first and second spaced-apart arms being below said predetermined level; and

said downcomer being connected to an interior of said channel.

4,998,510

COOLING SYSTEM FOR AIR COOLED INTERNAL COMBUSTION ENGINES

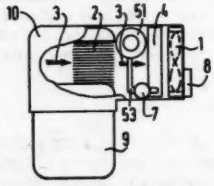
Armand Rognon, 18 rue des Chateau Auffrique, Coucy le, France 02380

Filed Jun. 1, 1989, Ser. No. 359,608

Claims priority, application France, Jun. 2, 1988, 88 07347

Int. Cl.[5] F01P *1/02*

U.S. Cl. 123—41.7 **10 Claims**



1. A cooling system for an air-cooled internal combustion engine, comprising:

first means for causing air to flow along a path directly surrounding individual cylinders of said engine;

a first cooling liquid jacket formed around an exhaust manifold of the engine for enabling a flow of a first cooling liquid around said exhaust manifold to cool a flow of exhaust gas flowing from said engine through said exhaust manifold; and

a radiator communicating with said first cooling liquid jacket to receive a flow of a first cooling liquid therefrom; said radiator being disposed to be cooled by said air flow that has passed said individual cylinders of said engine.

4,998,511

COMPRESSION IGNITION ENGINE WITH VARIABLE SWEPT VOLUME

Gilbert L. Ch. H. L. Van Avermaete, Um Bourbierg 2, L-3335 Hellange, Luxembourg

PCT No. PCT/LU88/00001, § 371 Date Jun. 14, 1989, § 102(e) Date Jun. 14, 1989, PCT Pub. No. WO89/03476, PCT Pub. Date Apr. 20, 1989

PCT Filed Oct. 12, 1988, Ser. No. 368,317

Claims priority, application Luxembourg, Oct. 16, 1987, 87021

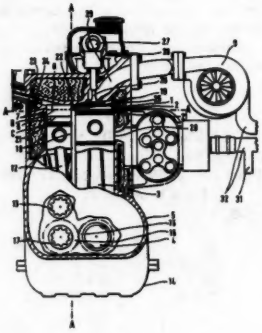
Int. Cl.[5] F02B *75/04*

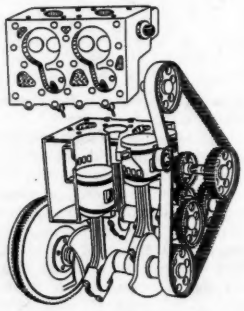
U.S. Cl. 123—48 B **4 Claims**

1. In a variable volumetric ratio, self ignition internal combustion engine, which comprises an axial grouping of two cylinders arranged in a parallel direction, side by side, with a centralization of two crankshafts in a cylinder block, the improvement wherein

each cylinder comprises a corresponding piston, a first of said pistons moving in a first of said cylinders, which serves for inlet, compression, expansion and exhaust phases, and via a connecting rod depends on a first of said crankshafts located in the cylinder block,

a second of said pistons moving in a second of said cylinders, which delimits a pre-combustion chamber where a heating plug and a fuel injector are located, and depending via a connecting rod on a second of said crankshafts also located in the cylinder block, and





the first crankshaft is operatively connected by a transmission to the second crankshaft.

4,998,512

EXHAUST PORT CONTROL SYSTEM FOR TWO STROKE ENGINE

Tatsuyuki Masuda, and Toshikazu Ozawa, both of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Jan. 26, 1990, Ser. No. 470,964

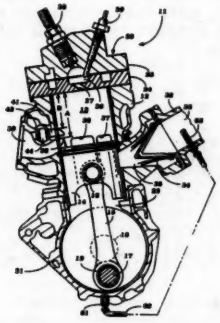
Claims priority, application Japan, Feb. 1, 1989, 1-20821

Int. Cl.[5] F02B *27/06, 25/20*

U.S. Cl. 123—65 PE **10 Claims**

1. In an exhaust port system for a two cycle internal combustion engine having a cylinder block having a cylinder bore, a piston reciprocating within said cylinder bore, a main exhaust port opening into said cylinder bore at the end of a main exhaust passage extending through said cylinder block for delivering exhaust gases from said cylinder bore to the atmosphere through a discharge opening, said exhaust passage increasing in cross sectional area from said exhaust port to said discharge opening to define a transverse projection of said cylinder block extending into said exhaust passage, a supplemental exhaust passage extending from a supplemental exhaust port in said cylinder bore through said cylinder block transverse projection and intersecting said main exhaust passage for delivering exhaust gases from said cylinder bore to said main exhaust

passage, said supplemental exhaust passage being a straight passage aligned with said discharge opening, and an exhaust



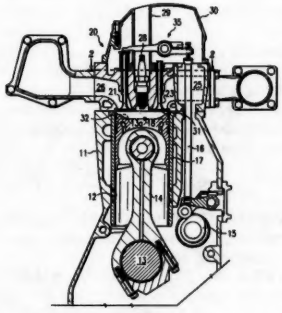
control valve supported with said transverse projection for controlling the flow through said supplemental exhaust port.

4,998,513

4-STROKE, STRATIFIED GAS ENGINE

James J. Gagnon, Carrollton, Tex., assignor to J-W Operating Company, Dallas, Tex.

Filed Mar. 19, 1990, Ser. No. 495,117
Int. Cl.[5] F02B *25/00*
U.S. Cl. 123—76 **14 Claims**



1. A 4-stroke, internal combustion, stratified engine comprising:

at least one cylinder having two intake valves and at least one exhaust valve;

a first manifold adapted for supplying only air to the first of said two intake valves;

a second manifold adapted for supplying a fuel-air mixture to the second of said two intake valves;

means for opening said first intake valve during the exhaust stroke of said engine while said at least one exhaust valve is open whereby air flowing through said first intake valve aids in scavenging the exhaust from said cylinder;

means for opening said second intake valve after said first intake valve is opened and as said at least one exhaust valve closes to allow said fuel-air mixture to flow into said cylinder without any substantial loss of fuel in the exhaust; and

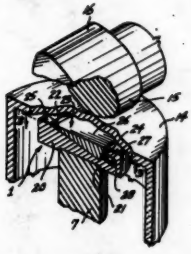
means for simultaneously closing both said first and second intake valves after completion of the intake stroke of said engine.

4,998,514

SELF-OPERATING LASH-ADJUSTING TAPPET ASSEMBLY

William J. Hixson, 4220 NE 90th, Seattle, Wash. 98115

Continuation-in-part of Ser. No. 298,250, Jan. 13, 1989, abandoned, which is a continuation of Ser. No. 140,606, Jan. 4, 1988, abandoned. This application Oct. 19, 1989, Ser. No. 424,023
Int. Cl.[5] F01L *1/22*
U.S. Cl. 123—90.53 **8 Claims**



1. A self-operating lash-adjusting tappet assembly for an engine having a valve with a stem adjacent to a cam shaft, said tappet assembly comprising a shim assembly interposed between the end of the valve stem and the cam shaft, said shim assembly including a body component forming a ramp and having a threaded bore opening adjacent to said ramp, a wedge component movable along said ramp to adjust the effective thickness of said shim assembly and a screw threadedly received in said bore and positioned such that turning of said screw in one sense moves said screw along said ramp to engage said wedge component and prevent movement of said wedge component in a direction which would decrease the effective thickness of said shim assembly, said body component being formed of a material having a greater coefficient of thermal expansion than the material of said screw, and said screw and body component being constructed and arranged relatively such that at normal ambient temperatures said screw is pinched in said bore so as to prevent rotation thereof whereas at normal operating temperatures of the engine said screw is freed by thermal expansion of said body component for turning in said bore.

4,998,515

INTERNAL COMBUSTION ENGINE TIMING CHAIN COVER

Americo Carvalho, Huntington Woods, Mich., assignor to KCR Engine Automotive Parts, Inc., Huntington Woods, Mich.

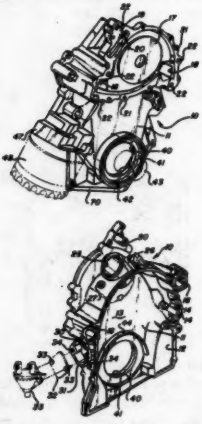
Filed Apr. 20, 1990, Ser. No. 511,718
Int. Cl.[5] F02F *7/00*
U.S. Cl. 123—195 C **11 Claims**

1. An internal combustion engine end and timing chain cover for a multi-cylinder, automotive vehicle type engine having a generally horizontally arranged engine block with a forward end and upper and lower portions, and a generally horizontally extending crankshaft with a forward end portion, and a timing chain mechanism on the block forward end above the crankshaft, comprising:

a unitary, cast metal, dish-like, cover having a forward wall surrounded by an integral edge wall shaped to fit over and mount upon the forward end of the engine block with the cover forming an enclosed cavity at the front end of the engine and with the cover cavity adapted to receive and enclose the engine timing chain mechanism portions located on the engine forward end;

said cover having a hole formed in its lower portion in alignment with the engine crankshaft, and with the engine crankshaft forward end portion extending through said hole and being surrounded by a seal;

said seal being mounted within the hole in the cover, within an open, rabbit-like groove surrounding said hole and opening forwardly of the cover, so that the seal may be removed in a forward direction relative to the engine and replaced without removing the cover when the cover is



mounted upon the block with the crankshaft extending therethrough;

and bolt receiving openings formed on the cover edge wall through which mounting bolts may be positioned for fastening the cover upon the engine.

4,998,516

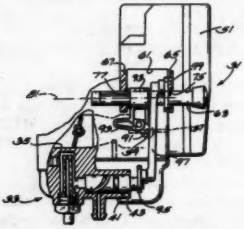
INTERNAL COMBUSTION ENGINE WITH SILENCER SUPPORTED CARBURETOR CONTROL MEMBER

Gregory D. Irwin, Lindenhurst, Ill., and Norman C. Franke, Kenosha, Wis., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Mar. 20, 1990, Ser. No. 495,989

Int. Cl.[5] F02B *77/00*

U.S. Cl. 123—198 E **2 Claims**



1. An internal combustion engine comprising a carburetor having an air induction passage, a valve member located in said air induction passage and moveable between open and closed positions, and a fuel supply member moveable between open and closed positions, an air intake silencer communicating with said air induction passage, an actuating member connected to one of said fuel supply and valve members for actuation of said one member between said open and closed positions in response to axial movement of said actuating member, and connected to the other of said fuel supply and valve members for actuation of said other member between said open and closed positions in response to rotary movement of said actuating member, and means on said air intake silencer for supporting said actuating member for rotary and axial movement.

4,998,517

HEAT INSULATING ENGINE

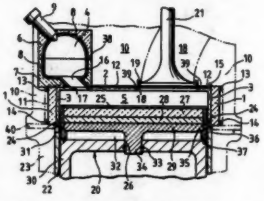
Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Motors, Tokyo, Japan

Filed Jul. 12, 1989, Ser. No. 378,938

Claims priority, application Japan, Jul. 21, 1988, 63-180250

Int. Cl.[5] F02B *19/10, 75/08, 77/02*

U.S. Cl. 123—270 **16 Claims**



1. A heat insulating engine comprising:

a cylinder head provided with suction and exhaust ports;

a head lower portion provided in said cylinder head;

a cylinder liner upper portion formed integrally with said head lower portion;

a main combustion chamber formed with said head lower portion and said cylinder liner upper portion;

auxiliary combustion chamber blocks provided on said cylinder head and consisting of a material of a low heat conductivity;

thin members provided on the inner surfaces of said auxiliary combustion chamber blocks and consisting of a high-density ceramic material;

an auxiliary combustion chamber formed on the inner side of said thin members on said blocks;

a fuel injection nozzle provided in said cylinder head and adapted to inject a fuel into said auxiliary combustion chamber;

a communication port formed in said auxiliary chamber block and communicating said main and auxiliary combustion chambers with each other; and

a thin member provided on the inner circumferential surface of said communication port and consisting of a high-density ceramic material.

4,998,518

SWIRL CONTROL SYSTEM FOR LEAN-BURN ENGINES

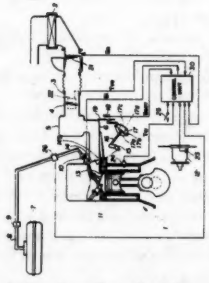
Hisashi Mitsumoto, Kanagawa, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed May 17, 1990, Ser. No. 524,427

Claims priority, application Japan, May 17, 1989, 1-125342

Int. Cl.[5] F02B *31/00*

U.S. Cl. 123—306 **6 Claims**



1. A swirl control system for a lean-burn engine, utilizing composite fuel blended with at least two different liquid fuels, comprising:

first means for monitoring an operating state of said engine;

second means for monitoring a mix proportion of one of the blended liquid fuels included in said composite fuel;

a control valve disposed in the vicinity of an intake port through which intake air is introduced via an intake air passage defined in an intake manifold of said engine into a combustion chamber of said engine, said control valve provided for varying a swirl mode of swirl occurring in said combustion chamber in such a manner as to open or close a portion of said intake air passage and;

swirl control means for controlling an opening angle of said control valve on the basis of the engine operating state monitored by said first means and the mix proportion monitored by said second means.

4,998,519

FUEL SUPPLY CONTROL SYSTEM FOR AN ENGINE

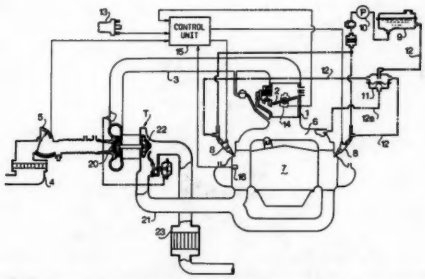
Tomoya Kobayashi, Fuchu, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 355,128, May 15, 1989, abandoned, which is a continuation of Ser. No. 154,746, Feb. 10, 1988, abandoned. This application Jun. 14, 1990, Ser. No. 541,172

Claims priority, application Japan, Feb. 18, 1987, 62-35103

Int. Cl.[5] F02D *33/00*

U.S. Cl. 123—333 **3 Claims**



1. In a system for cutting off the fuel supply of an engine having a fuel supply means, said system comprising an actual engine speed detector means for producing an engine speed signal dependent on said actual engine speed, comparing means for comparing said actual engine speed signal and a fuel cutoff engine speed signal and producing a fuel cutoff signal when said actual engine speed signal exceeds said fuel cutoff engine speed signal, and means responsive to said fuel cutoff signal for cutting off the fuel supply by the fuel supply means, the improvement comprising

temperature detector means for producing a coolant temperature signal dependent on coolant temperature at the start of the engine,

setting means responsive to said coolant temperature signal for setting an initial value of said fuel cutoff engine speed at the start of the engine, said initial value being represented as an increasing function with increase of said coolant temperature, and

correction means for correcting said fuel cutoff engine speed to increase said fuel cutoff engine speed from said initial value in response to elapsed time after the start of the engine independent of coolant temperature.

4,998,520

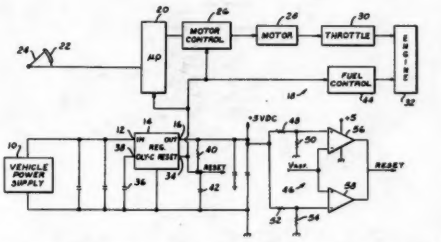
REDUNDANT RESET FOR ELECTRONIC THROTTLE CONTROL

Danny O. Wright, Newport News, Va., assignor to Siemens Automotive L.P., Troy, Mich.

Filed May 11, 1990, Ser. No. 522,340

Int. Cl.[5] F02D *11/10, 41/26*

U.S. Cl. 123—399 **7 Claims**



1. In an automotive vehicle electrical system having a D.C. power supply of given voltage for powering certain circuits of the electrical system with substantially that voltage, said electrical system comprising other circuits, including a microprocessor, operating at a voltage that is appreciably less than said given voltage, said microprocessor comprising a reset input via which the microprocessor can be reset by an externally delivered reset signal, said electrical system further comprising a voltage regulator integrated circuit that is powered by said given voltage to develop said lesser voltage therefrom, said voltage regulator integrated circuit comprising a voltage input receiving said given voltage, a voltage output delivering said lesser voltage, a reset pulse output at which a reset pulse is given each time that said voltage regulator integrated circuit is powered up by the application of said given voltage to said voltage input of said voltage regulator integrated circuit, and a timing input to which an external circuit is connected to set the width of each reset pulse issued by said voltage regulator integrated circuit at said reset pulse output thereof, and coupling means for coupling each reset pulse from said reset pulse output of said voltage regulator integrated circuit to said reset input of said microprocessor, the improvement which comprises external timing circuitry connected with said voltage output of said voltage regulator integrated circuit and with said reset input of said microprocessor such that a reset pulse derived from said lesser voltage given at said voltage output of said voltage regulator integrated circuit is delivered to said reset input of said microprocessor via said coupling means should said voltage regulator integrated circuit itself fail to give a reset pulse at its own reset pulse output upon said voltage regulator integrated circuit being powered up by the application of said given voltage to said voltage input of said voltage regulator integrated circuit.

4,998,521

IGNITION TIMING CONTROL FOR OUTBOARD MOTOR

Seiji Inoue, and Seiichi Tanaka, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushika Kaisha, Hamamatsu, Japan

Continuation of Ser. No. 325,294, Mar. 17, 1989. This application Mar. 15, 1990, Ser. No. 493,893

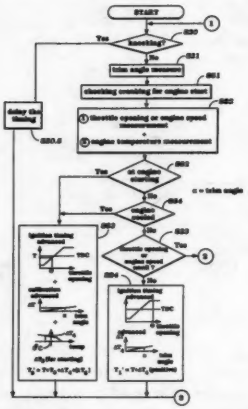
Claims priority, application Japan, Mar. 16, 1989, 1-64441

Int. Cl.[5] F02P *5/14*

U.S. Cl. 123—424 **12 Claims**

1. In an engine control for an outboard motor adapted to be mounted for trim adjustment of the position of the outboard motor, said engine having a manual control for operator adjustment of the speed of said engine, and at least one of a fuel system and an ignition system controlled by said manual con-

trol, the improvement comprising means for sensing the trim condition of the engine and means for adjusting the system of



the engine for response to the sensed trim condition to maintain normal running even when the trim condition is changed.

4,998,522

METHOD FOR INJECTING FUEL INTO AN INTERNAL-COMBUSTION ENGINE

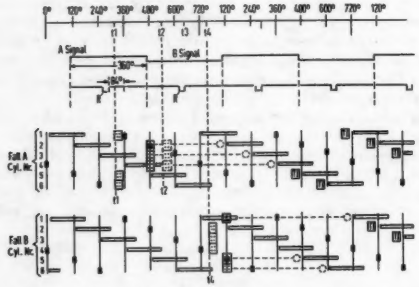
Erwin Achleitner, Regensburg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Nov. 3, 1989, Ser. No. 431,199

Claims priority, application European Pat. Off., Nov. 28, 1988, 88119832.9

Int. Cl.[5] F02D *41/06*

U.S. Cl. 123—491 **7 Claims**



1. A method for injecting fuel into cylinders of a multi-cylinder internal-combustion engine, whereby a normal quantity calculated by a means for control connected to the engine is sequentially injected into the cylinders in a normal sequence following a starting phase and whereby an increased quantity of fuel, a preliminary quantity of fuel, is injected thereinto during the starting phase, a static position transmitter (LG) connected to a crankshaft of the engine and supplying a periodic position signal having two different sub-signals, an A-signal and a B-signal, that extend over a full crankshaft revolution and to which a first or second cylinder group is allocated, respectively, so that a current cylinder group is identified by the respectively present sub-signal, a position transmitter (PG) connected to the crankshaft of the engine and supplying a position signal with a reference pulse (R) per revolution of the crankshaft, the method comprising the steps of:

forming said cylinder groups from those cylinders whose intake valves are predominantly closed during the allocated sub-signal of the position transmitter (LG);

injecting the preliminary quantity of fuel only a single time into every cylinder of the internal-combustion engine after the recognition of starting, by

first, triggered by the recognition of start, injecting simultaneously into all cylinders of the current cylinder group and

second, injecting into the cylinders of the second cylinder group either simultaneously, triggered by the change of the position signal when this occurs before the first reference pulse (R) or sequentially in normal sequence, triggered by the reference pulse when this precedes the change of the position signal; and

beginning the sequential injection of the normal quantity with the cylinder that follows the last cylinder of the second cylinder group, whereby this is identified by counting the cylinders in normal sequence from the beginning of the injection into the cylinders of the second cylinder group.

4,998,523

INJECTION TIMING ADJUSTER FOR INTERNAL COMBUSTION ENGINES

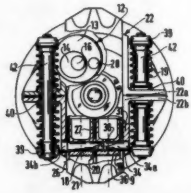
Gerhard Geyer, Munich; Johann Mendle, Hoerlkofen, and Hermann-Josef Dillmann, Riemerling, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 16, 1990, Ser. No. 466,118

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1989, 3907026

Int. Cl.[5] F02M *37/04, 59/00*

U.S. Cl. 123—502 **21 Claims**



1. A rotating injection timing adjuster for internal combustion engines such as Diesel engines comprising a drive means (2) and a driven shaft (3), adjusting pistons (18) accommodated inside the rotating adjuster and actuatable counter to a restoring force by a pressure of a hydraulic medium, which pressure is controlled as a function of operating characteristics, the adjusting pistons being guided in outward-pointing cylinder bores (20) of a piston holder (9) disposed on a hub element (10) of said driven shaft (3), and a mutual rotational position of said drive means (2) and said driven shaft (3) is variable, by means of said adjusting pistons and by means of intermediate elements (22) and transmission elements attached to said intermediate elements, via a cam adjustment mechanism (12) that connects said drive means (2) to said driven shaft (3), wherein coupling elements (34) connected to the intermediate elements and said adjusting pistons (18) and disposed at right angles to the longitudinal axes (21) of the cylinder bores (20) serve as transmission elements for transmitting an adjusting motion of the adjusting pistons (18) to the intermediate elements (22), pins (28) attached to the intermediate elements (22) engage the cam adjusting mechanism (12) and serve as transmission elements between the intermediate elements (22) and the cam adjustment mechanism (12), said piston holder (9) includes limiting faces (26) extending parallel to the longitudinal axis (23) of the adjuster and parallel to the longitudinal axes (21) of the cylin-

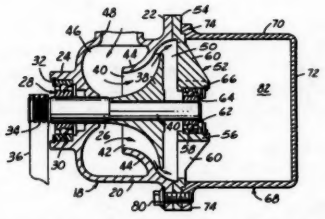
der bores (20), and the intermediate elements (22) encompass the piston holder (9) in a U-shape on its limiting faces (26) and one end face and as a result are radially guided on the piston holder (9).

4,998,524

MANIFOLD MOUNTED AIR PUMP

Gregg T. Black, Livonia, and Joseph F. Goulart, Union Lake, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed May 15, 1989, Ser. No. 351,989
Int. Cl.[5] F02B *33/00*
U.S. Cl. 123—559.1 **1 Claim**



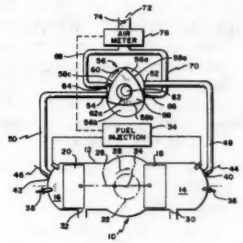
1. The combination of: an internal combustion engine having an elongated intake manifold with an open ended portion acting as an air inlet to receive air flow into the engine; an air pump with a housing supported at the open end of the intake manifold, the pump housing having an open ended portion acting as an air outlet from the pump, the open ended portions of the pump and the manifold being sized and configured so that the air outlet of the pump and the air inlet of the manifold are axially aligned when the open ended portion of the pump is attached to the open ended portion of the manifold, whereby air flows substantially in an axial direction from the pump into the manifold; the pump housing having a generally hollow interior and a substantially closed end portion opposite the open ended portion; and elongated shaft extending axially through the interior of the pump housing with a first end portion extending through the closed end portion so that an exterior end portion to the pump housing is exposed, an opposite second end portion of the shaft extending axially through the pump housing and into the open ended portion of the manifold; an impeller attached to the shaft between its first and second end portions with the pump housing encircling the impeller so that air may flow past the impeller from the vicinity of the first end portion of the shaft to the vicinity of the second end portion of the shaft; rotative input means coactive with the exterior end portion of the shaft for causing rotation of the shaft and impeller whereby air is pumped into the intake manifold; a shaft supporting assembly for the second end portion of the shaft, the assembly including a peripheral annulus-like edge portion secured between those end portions of the pump housing and the manifold which respectively define the air outlet and the air inlet, the assembly further including a central shaft engaging bearing portion attached to the peripheral edge portion by a plurality of thin bridge portions; the bridge portions being configured so that at least a substantial portion of the central shaft engaging bearing portions is positioned within the manifold whereby the axial length of the combination pump and manifold is shortened.

4,998,525

AIR SUPPLY SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Aloysius J. Eftink, 7103 Bonnie Mill La., Springfield, Va. 22150

Filed Jun. 12, 1989, Ser. No. 364,318
Int. Cl.[5] F02B *33/36*
U.S. Cl. 123—559.1 **28 Claims**



1. In a reciprocating piston internal combustion engine having a crankshaft and at least two cylinders, each cylinder having a displacement volume V_1, the improved means for supplying air to each cylinder comprising:

(a) a rotary, trochoidal chamber air pump defining at least one pair of pumping chambers, the number of pumping chambers being equal to the number of cylinders in the engine;

(b) air intake conduits connecting each pumping chamber to one cylinder of the engine;

(c) a rotor rotatable in each pair of pumping chambers, the rotor having three faces such that passage of a face of the rotor through a pumping chamber forces air in the pumping chamber into the associated air intake conduit and, consequently, into the engine cylinder; and,

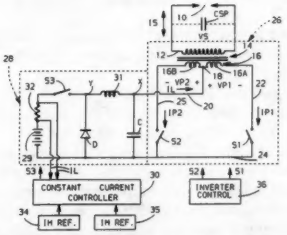
(d) means interconnecting the rotor and the crankshaft so as to rotate the rotor approximately one revolution for every three revolutions of the crankshaft.

4,998,526

ALTERNATING CURRENT IGNITION SYSTEM

Kalyan P. Gokhale, Auburn Hills, Mich., assignor to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 522,706, May 14, 1990, abandoned. This application Jun. 5, 1990, Ser. No. 533,329
Int. Cl.[5] F02P *3/08*
U.S. Cl. 123—598 **15 Claims**



1. An ignition system for a spark ignited internal combustion engine comprising, a transformer having a primary winding means comprised of at least one primary winding and a secondary winding, means connecting said secondary winding to a spark plug, a source of direct voltage, a capacitor, means for charging said capacitor from said source of direct voltage, means for discharging said capacitor through said primary winding means to thereby cause a voltage to be developed in said secondary winding that is high enough to initiate an arc at

the electrodes of said spark plug, and means operative after said arc has been initiated for causing an alternating current to be developed in said secondary winding that is applied to the electrodes of said spark plug from said secondary winding to maintain said arc, said last named means comprising means connecting said primary winding means sequentially to said source of direct voltage.

4,998,527

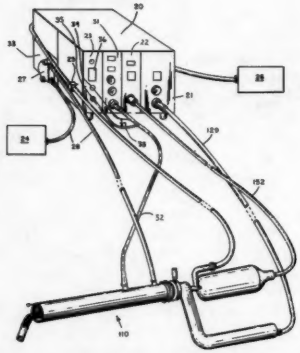
ENDOSCOPIC ABDOMINAL, UROLOGICAL, AND GYNECOLOGICAL TISSUE REMOVING DEVICE

William F. Meyer, Walnut, Calif., assignor to Percutaneous Technologies Inc., Walnut, Calif.

Continuation-in-part of Ser. No. 387,577, Jul. 27, 1989, abandoned. This application Mar. 26, 1990, Ser. No. 498,946

Int. Cl.[5] A61B *1/00*

U.S. Cl. 128—6 15 Claims



1. An endoscopic resecting system for viewing and resecting a target tissue from within or near the abdominal cavity, said endoscopic resecting system comprising:

a. a sleeve

b. a compartmentalized hollow tube with a first compartment of a first set of dimensions and a second compartment of a second set of dimensions larger than said first sets of dimensions;

c. visualizing means for directly viewing the target tissue, a portion of said visualizing means being disposed in said first compartment;

d. illuminating means for providing illumination of the target tissue, a portion of said illuminating means being disposed in said first compartment;

e. resecting means for resecting the target tissue, a portion of said resecting means being disposed in said second compartment;

f. inletting means for inletting a transport fluid to said resected target tissue, a portion of said inletting means being disposed in said first compartment; and

g. outletting means for outletting said transport fluid to the suction device, a portion of said outletting means being disposed in said second compartment whereby said visualizing means, said illuminating means, said resecting means, said inletting means and said outletting means all function in an integrated and coordinated manner;

h. gas insufflation means for expanding the abdomen, a portion of said gas insufflation means being disposed within said sleeve.

i. means to apply a drug treatment, said drug treatment means being disposed within said gas insufflation means;

j. blood coagulating means, a portion of said coagulating means being mechanically connected to said resecting means.

4,998,528

TRIGGERING THERAPEUTIC SHOCK WAVES

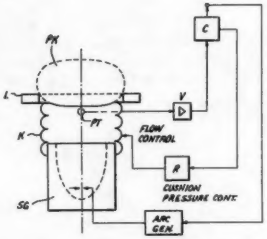
Wolfgang Erhardt, Fuerstenfeldbruck, Fed. Rep. of Germany, assignor to Dornier Medizintechnik GmbH, Germering, Fed. Rep. of Germany

Filed Jun. 21, 1988, Ser. No. 209,688

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1987, 3720826

Int. Cl.[5] A61B *5/0205, 17/22*

U.S. Cl. 128—24 A 5 Claims



1. Method of triggering the production of shock waves for therapy of a living being, comprising the steps of providing a shock wave generator and associated cushion for coupling accoustically said shock wave generator to the body of the living being, detecting cyclic pressure variations in the cushion, the variations being within a range of about 10 mbar and due to breathing cycles of the living being;

detecting in said cyclic pressure variations a particular phase; and

repeatedly triggering the production of shock waves by said generator into said cushion in response to the detection of occurrences of said particular phase.

4,998,529

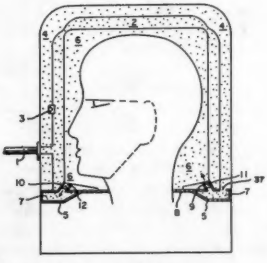
DECOMPRESSION AND TOXIC FUME PROTECTION APPARATUS

Bertil Werjefelt, Kailua, Hi., assignor to Xenex Corporation and Xenex Systems Limited Partnership I, both of Kaneohe, Hi.

Continuation-in-part of Ser. No. 11,653, Apr. 27, 1988, abandoned. This application Sep. 27, 1989, Ser. No. 497,241

Int. Cl.[5] A62B *18/08*

U.S. Cl. 128—201.13 7 Claims



1. A breathing device, comprising:

(a) an inner chamber being of sufficient volume so as to be adapted to enclose the head of a wearer and having a neck seal near the bottom thereof adapted to fit around the neck of the wearer;

(b) an inflatable outer chamber concentric with and surrounding said inner chamber, said outer chamber having interior and exterior walls, said inner chamber being defined by said interior wall of said inflatable outer chamber;

(c) a gas reservoir;

(d) a carbon dioxide removal means;

(e) a gas inlet adapted for connection to a source of gas, leading to said outer chamber and a one-way valve means positioned in said exterior wall of said outer chamber, said valve means communicating with said reservoir and said outer chamber for permitting gas to flow from said outer chamber to said reservoir;

(f) a passageway connected to said reservoir, said carbon dioxide removal means and said inner chamber for permitting gas to flow between said reservoir and said inner chamber through said carbon dioxide removal means; and

(g) said one-way valve means remaining closed until said outer chamber is inflated to a rigidity adapted to enclose the head of the wearer and sufficient to maintain substantially constant volume of said inner chamber while the wearer is breathing.

4,998,530

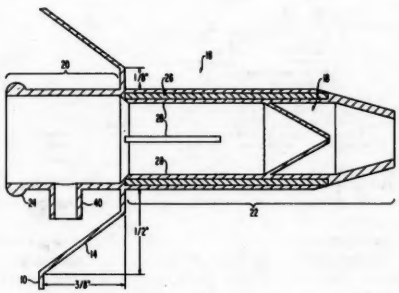
RESUSCITATION AID

T. Anthony DonMichael, 309 Panorama Dr., Bakersfield, Calif. 93305

Continuation-in-part of Ser. No. 202,101, Jun. 1, 1988, abandoned. This application Oct. 11, 1989, Ser. No. 419,658

Int. Cl.[5] A61M *16/00*

U.S. Cl. 128—203.11 **13 Claims**



1. A medical device for enabling a rescuer to administer mouth-to-mouth resuscitation to a victim while maintaining a sanitary barrier between victim and rescuer, comprising:

a sheet of a flexible material forming a barrier to microorganisms, said sheet being dimensioned to completely cover the victim's mouth, said sheet having an opening and a shaped portion of circular form which surrounds said opening and is shaped to allow the rescuer's lips to form an air-tight seal with the victim's lips when the rescuer is blowing air into the victim's mouth, said sheet, including said shaped portion, being formed to permit the victim to exhale without obstruction when the rescuer's lips are withdrawn from said sheet;

a tubular member defining a confined air passage extending through said opening and having a first portion located to be inserted into the victim's mouth and over the victim's tongue when said sheet is in place and a second portion located to be inserted into the mouth of the rescuer; and

means defining a one-way valve fastened to said first portion of said tubular member for permitting free passage of air only from the rescuer to the victim.

4,998,531

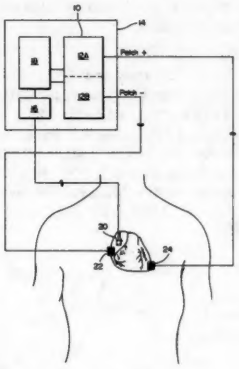
IMPLANTABLE N-PHASIC DEFIBRILLATOR OUTPUT BRIDGE CIRCUIT

David E. Bocchi, Vadnais Heights; Jeffrey T. Laackman, Isanti, and Stanley M. Bach, Jr., Shoreview, all of Minn., assignors to Cardiac Pacemakers, Inc., St. Paul, Minn.

Filed Mar. 28, 1990, Ser. No. 501,527

Int. Cl.[5] A61N *1/00*

U.S. Cl. 128—419 D **5 Claims**



1. An output circuit for use in an implantable defibrillation system, said circuit comprising:

capacitor means for storing a predetermined voltage;

first and second switching means, both connected to said capacitor means and capable of being triggered to active conditions;

a ground-return terminal;

first and second electrode lead terminals connected to said first and second switching means, respectively;

third and fourth switching means connected to said first and second lead terminals, respectively, for selectively connecting said first and second electrode lead terminals, respectively, to said ground-return terminal when triggered to active conditions; and

triggering means for triggering said first and said third switching means to said active conditions to allow voltage stored by said capacitor means to discharge through said first and second electrode lead terminals in a first polarity, and for triggering said second and fourth switching means to said active conditions to allow voltage stored by said capacitor means to discharge through said first and second electrode lead terminals in a second polarity opposite to said first polarity.

4,998,532

PORTABLE ELECTRO-THERAPY SYSTEM

Neil Griffith, San Diego, Calif., assignor to LTI Biomedical, Inc., San Diego, Calif.

Continuation of Ser. No. 866,766, May 23, 1986, abandoned. This application Feb. 21, 1989, Ser. No. 313,332

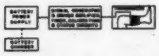
Int. Cl.[5] A61N *1/00*

U.S. Cl. 128—419 F **21 Claims**

1. A portable apparatus for electro-therapy of bone fractures comprising:

a source of electric power connected to a means for converting said electric power into a series of substantially amplitude-symmetric voltage cycles, said voltage cycles comprising a train of bursted pulses having a pulse width of 0.5-20 microseconds, and a transducer means connected to

said source of electric power for receiving said symmetric voltage cycles positioned so that an electromagnetic field



at a fracture site is generated by applying said electric power to said transducer.

4,998,533

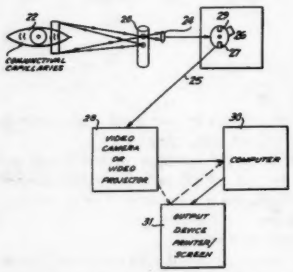
APPARATUS AND METHOD FOR IN VIVO ANALYSIS OF RED AND WHITE BLOOD CELL INDICES

James W. Winkelman, 62 Rangeley Rd., Brookline, Mass. 02167

Continuation of Ser. No. 165,287, Mar. 8, 1988, abandoned, which is a continuation-in-part of Ser. No. 886,306, Jul. 15, 1986, abandoned. This application Mar. 9, 1989, Ser. No. 320,896

Int. Cl.[5] A61B *1/04, 3/12, 5/02*

U.S. Cl. 128—637 **22 Claims**



1. Apparatus for in vivo determination of red and white blood cell characteristics from a flow of blood cells in mucus membranes comprising:

image capturing means for optically isolating individual blood cells in at least one flow of blood cells in said mucus membranes;

image receiving means for receiving a plurality of still images of said blood cells from said image capturing means;

filtering means for interposing light filters on said images; and

means for determining blood cell characteristics MCV, Hb, MCHC, RBC and WBC from said still images.

4,998,534

BLOOD PRESSURE MONITOR WITH COMPENSATION FOR PHYSIQUE AND METHOD OF USE

Philander P. Claxton, III, Rockville, Md.; George L. McDade, and Jon D. Schaffer, both of Knoxville, Tenn., assignors to Medical Devices Limited Partnership, Rockville, Md.

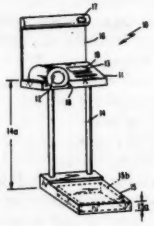
Filed Oct. 19, 1989, Ser. No. 422,816

Int. Cl.[5] A61B *5/0205*

U.S. Cl. 128—670 **13 Claims**

1. In an apparatus for determining the blood pressure of a user, comprising an inflatable cuff means for encircling a portion of the user's body, an inflation means for controllably inflating and deflating said cuff means, pressure variation sensing means for monitoring blood circulation of said user during inflation and deflation of said cuff means, determining means responsive to said pressure variation sensing means for determining the blood pressure of said user including measuring means for measuring the diastolic and systolic blood pressure of said user and means for communicating the output of said determining means to said user, the improvement comprising:

data entry means for inputting data representative of a parameter of the physique of the user,



wherein said determining means includes means responsive to said data entry means for applying a correction to the output of said measuring means to correct the output of said determining means.

4,998,535

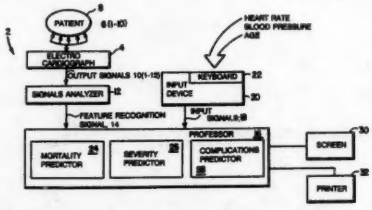
THROMBOLYSIS PREDICTIVE INSTRUMENT

Harry P. Selker, Wellesley, Mass.; Galen S. Wagner, Durham, N.C.; W. Douglas Weaver, Seattle, Wash., and Robert M. Califf, Durham, N.H., assignors to Univ. of Washington New England Medical Center Hospitals, Inc., Seattle, Wash. and Duke University, Durham, N.C.

Filed Sep. 5, 1989, Ser. No. 403,129

Int. Cl.[5] A61B *5/04*

U.S. Cl. 128—696 **19 Claims**



1. An instrument for evaluating whether to use thrombolytic therapy to treat a patient with a heart condition, the instrument comprising:

a first input means adapted to be coupled to said patient for receiving electrocardiographic data from the patient before using thrombolytic therapy on said patient; and

a processing means for computing a predicted benefit to the cardiovascular health of the patient as a consequence of using thrombolytic therapy on said patient, said predicted benefit being derived from said electrocardiographic data.

4,998,536

DEFIBRILLATOR PAD ASSEMBLY AND METHOD FOR USING SAME

Lorne C. Scharnberg, West Des Moines, Iowa, assignor to Kas Products, Inc., Des Moines, Iowa

Filed Dec. 26, 1989, Ser. No. 456,497

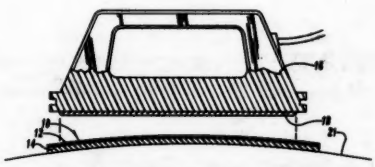
Int. Cl.[5] A61N *1/04*

U.S. Cl. 128—800 **8 Claims**

1. A method for preparing a patient's chest having an exposed skin surface for accepting a defibrillator paddle, said method comprising:

taking a laminated defibrillator pad having a bottom layer of electrically conductive polymer which is tacky so as to adhere to most surfaces it contacts, said pad having an upper layer comprising fabric material formed from filamentous carbon, said upper layer being adhered to and in electrical contact with said bottom layer;

placing said pad on said patient's chest with said bottom layer in contact with said exposed skin surface of said patient's chest whereby said tackiness of said bottom layer will cause said pad to be detachably adhered to and in electrical contact with said exposed skin surface of said patient's chest; and



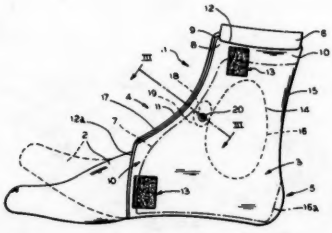
placing said defibrillator paddle in facing engagement with and in electrical contact with said upper layer of said pad whereby said pad will provide electrical continuity from said defibrillator paddle to said exposed skin surface of said patient.

4,998,537

SUPPORT FOR THE ANKLE JOINT AREA

Roland Rau, Gengenbach, Fed. Rep. of Germany, assignor to Deutsche Sporflex GmbH, Nurtingen, Fed. Rep. of Germany

Filed Jul. 27, 1988, Ser. No. 224,748
Int. Cl.[5] A61F *3/00*
U.S. Cl. 128—80 H **17 Claims**



1. A support apparatus for an ankle joint area of a leg, in particular for laterally supporting a lower ankle joint, said support apparatus comprising:

a supporting upper part having a boot-like partial shoe configuration for laterally enclosing a rear area of a foot and portions of the lower part of said leg,

said supporting upper part being fabricated of substantially rigid material,

said supporting upper part having front portions forming opposed sides defining a front opening, said front opening having at least one front edge,

said supporting upper part further including at least one side opening in the area of an anklebone,

at least one front area of said supporting upper part, between said at least one front edge and said at least one side opening on a common side of said supporting upper part being interrupted and formed as two tabs, which are overlapping,

fastener means operably arranged adjacent said front opening for facilitating attachment of said support apparatus upon said ankle joint area, and

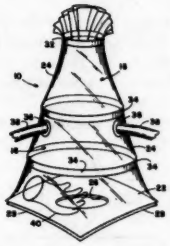
a swivel joint member operably arranged adjacent said overlapping tabs for connecting said tabs and enabling relative motion between said overlapping tabs.

4,998,538

MEDICAL DRAPE FOR LASER SURGERY

Deborah A. Charowsky, and Harry P. Charowsky, both of 45047 SE. 166th St., North Bend, Wash. 98045

Filed Aug. 25, 1989, Ser. No. 398,712
Int. Cl.[5] A61B *19/12*
U.S. Cl. 128—856 **21 Claims**



1. A medical drape for use in a medical procedure wherein a laser is employed to remove tissue from a patient, said drape comprising:

(a) an enclosure extending between the laser and the patient tissue to be removed, said enclosure defining a substantially enclosed space between the laser and the patient tissue;

(b) said enclosure including target area boundary means for encircling a target area of patient tissue to be removed, said target area boundary means defining an opening in said enclosure; and

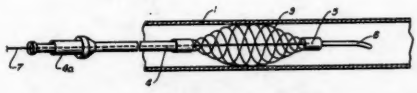
(c) said enclosure including containment means for substantially retaining, in said enclosed space, material resulting from laser removal of patient tissue.

4,998,539

METHOD OF USING REMOVABLE ENDO-ARTERIAL DEVICES TO REPAIR DETACHMENTS IN THE ARTERIAL WALLS

Gerard L. Delsanti, 15 Les Helianthes, 13390 Auriol, France

Filed Dec. 13, 1988, Ser. No. 283,729
Claims priority, application France, Dec. 18, 1987, 87 17975
Int. Cl.[5] A61M *29/00*
U.S. Cl. 128—898 **3 Claims**



1. A method of treating a patient's artery after the use of a catheter in an interventional procedure therein has damaged a section of arterial lining which can result in a blood flow restriction through the damaged arterial section, the method comprising:

(a) withdrawing from the patient's artery the catheter used in the interventional procedure;

(b) providing a separate catheter assembly having an elongated catheter body with an expandable member at the distal end thereof formed of interwoven strands of wire or fiber which are secured at the proximal and distal ends of the expandable member;

(c) advancing the catheter assembly into and through the patient's arterial system until the expandable member is disposed within the damaged arterial section;

(d) reducing the axial spacing between the distal and proximal ends of the expandable member to expand the expandable member to radially press the strands thereof against the damaged arterial lining and thereby expand the pas-

sageway through the damaged arterial section and increase the blood flow therethrough;

(e) holding the expandable member stationary within the damaged arterial section in the expanded condition with the strands thereof pressing against the damaged arterial lining while blood flows through the arterial passageway for a period of sufficient length to ensure that the arterial lining within the damaged section is resecured to the arterial wall;

(f) increasing the axial spacing between the proximal and distal ends of the expandable member at the end of said period to thereby reduce the radial dimension thereof so that the expandable member can be removed from the damaged arterial section; and

(g) removing the catheter assembly from the patient's artery.

4,998,540

METHOD OF AND APPARATUS FOR ELIMINATING IRREGULARITIES FROM A STREAM OF FIBROUS MATERIAL

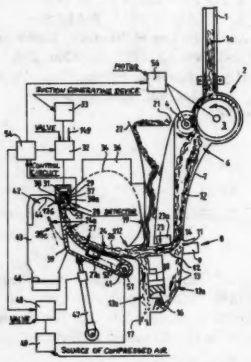
Peter Brand, Hamburg, Fed. Rep. of Germany, assignor to Körber AG, Kampchaussee, Fed. Rep. of Germany

Filed Mar. 21, 1989, Ser. No. 326,742

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1988, 3810629

Int. Cl.[5] A24C *5/18, 5/31*

U.S. Cl. 131—110 **42 Claims**



1. A method of making a stream of fibrous material, such as a tobacco stream, for conversion into the filler of a cigarette rod, comprising the steps of advancing a flow of loose fibrous material along a first path having a discharge end; transferring successive increments of the advancing flow into a second path and conveying the transferred fibrous material along the second path in the form of a stream; monitoring the stream for the presence or irregularities including stoppage of the stream and excessive accumulations of fibrous material in the stream; ;and interrupting the transfer of of fibrous material into the second path in response to detection of irregularities, including admitting fibrous material from the discharge end of the first path into a third path which bypasses the second path.

4,998,541

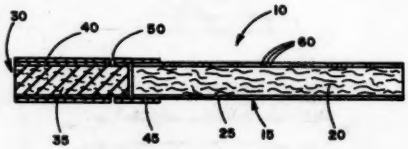
CIGARETTE

Patricia F. Perfetti, Winston-Salem, and William R. Cook, Clemmons, both of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Nov. 27, 1989, Ser. No. 441,677

Int. Cl.[5] A24D *1/00, 1/02*

U.S. Cl. 131—336 **19 Claims**



1. A cigarette comprising:

(a) a rod of smokable material contained in a circumscribing paper wrapping material thereby forming a smokable rod; the wrapping material (i) having a cellulosic base web containing inorganic filler including magnesium hydroxide, (ii) having a basis weight of greater than about 40 g/m^2, (iii) including water soluble alkali metal salt in an amount greater than about 35 mg alkali metal ions per gram of dry base web, and (iv) having a weight ratio of potassium ions to sodium ions of greater than about 100:1;

(b) a filter element positioned adjacent one end of the tobacco rod, the filter element exhibiting a removal efficiency of particulate matter from mainstream tobacco smoke of greater than about 40 weight percent; and

(c) tipping material circumscribing the filter element and an adjacent region of the tobacco rod.

4,998,542

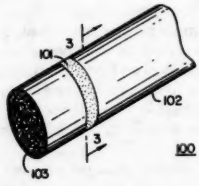
WRAPPER FOR SMOKING ARTICLES AND METHOD FOR PREPARING SAME

Andrew G. Kallianos, Midlothian; A. Clifton Lilly, Jr., Chesterfield; Jerry F. Whidby, Richmond, and Rowland W. Dwyer, Jr., Richmond, all of Va., assignors to Philip Morris Incorporated, New York, N.Y.

Filed Feb. 23, 1989, Ser. No. 315,388

Int. Cl.[5] A24D *1/02*

U.S. Cl. 131—365 **24 Claims**



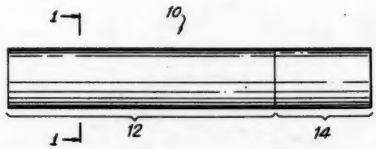
1. A wrapper for smoking articles comprising paper fibers and an amorphous inorganic network produced by a sol-gel process applied thereto.

4,998,543

SMOKING ARTICLE EXHIBITING REDUCED SIDESTREAM SMOKE, AND WRAPPER PAPER THEREFOR

Barbro L. Goodman, 17310 Branders Bridge Rd., Colonial Heights, Va. 23834, and Willie G. Houck, Jr., 7753 Lake Forest Dr., Richmond, Va. 23235

Filed Jun. 5, 1989, Ser. No. 361,245
Int. Cl.[5] A24D *1/02*
U.S. Cl. 131—365 27 Claims



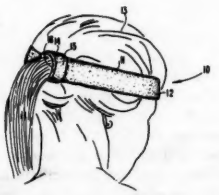
1. A cigarette comprising a tobacco rod surrounded by inner and outer layers of paper formulated to reduce the amount of sidestream smoke produced by the cigarette, said outer layer of paper having a basis weight of about 30–70 grams per square meter, an initial porosity of about 2–10 cubic centimeters per minute by the Coresta method, a calcium carbonate filler loading of about 30–40% by weight employing calcium carbonate having a surface area of about 20–80 square meters per gram by the BET method, about 2–10% by weight of a burn chemical, about 0–1% by weight of monoammonium phosphate, and about 0–1% by weight of sodium carboxy methyl cellulose, said outer paper being perforated to increase its porosity to about 50–100 cubic centimeters per minute by the Coresta method, said inner layer of paper having a basis weight of about 15–25 grams per square meter, a porosity of about 20–40 cubic centimeters per minute by the Coresta method, a calcium carbonate filler loading of about 2–15% by weight, and about 0–2%, by weight of a burn chemical.

4,998,544

COMBINATION HEADBAND AND PONYTAIL HOLDER

Stephen D. Obergfell, 5134 E. 65th St., Indianapolis, Ind. 46220

Filed Dec. 1, 1989, Ser. No. 444,414
Int. Cl.[5] A45D *7/02*
U.S. Cl. 132—212 6 Claims



1. A combination headband and ponytail holder which comprises:

an elastic headband consisting of a first flat band adapted for encircling a person's head, said first band being sustantially continuous, but including a first aperture sized to receive a ponytail therethrough, and

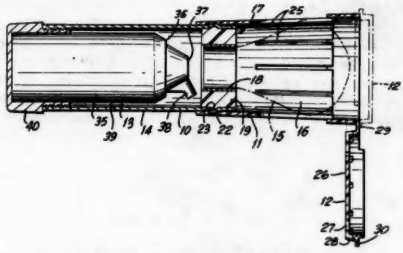
an elastic ponytail holder consisting of a second continuous, circular, elastic band adapted for encircling a person's ponytail, said second band defining a second aperture sized to receive a ponytail therethrough, said second band being attached to said first band with the second aperture aligned with the first aperture, said second band including second attachment means for selectively adjusting the size of said second band to snugly retain therein the person's ponytail.

4,998,545

PORTABLE SHAVING BRUSH

Paul Hiromura, 596 Warwick Ave., Teaneck, N.J. 07666

Filed Jan. 30, 1990, Ser. No. 472,358
Int. Cl.[5] A45D *27/16*
U.S. Cl. 132—290 2 Claims



1. A portable shaving brush assembly including:

(a) a handle assembly including a cylindrical hollow tubular member forming a handle and having opposite first and second open ends;

(b) said handle assembly including an annular member connected at one end of said tubular member;

(c) a brush comprising flexible bristles, one end of said brush being held with said annular member and the opposite end being a free end;

(d) a shield cover having holes therethrough, said cover being tubular, funnel shaped and fitting over said brush and being removable connected to said handle assembly, said funnel shaped shield cover having a larger diameter open end proximate the free end of the brush and a smaller diameter open end proximate said handle assembly;

(e) a cap hinged to said shield cover and removably positioned to cover one end thereof;

(f) a shave cream can filled with shaving cream and having a cylindrical end, said can removably positioned within the hollow of said tubular handle member; and

(g) a can holder cap which grips and holds said can end and and is removable from said handle member as a unit with said can and is removably connected to the second end of said tubular handle member.

4,998,546

METHOD AND APPARATUS FOR GRIP ENHANCING

Frank J. Cismoski, P.O. Box 123, Oak Lawn, Ill. 60454

Filed Jun. 14, 1989, Ser. No. 365,776
Int. Cl.[5] B08B *3/08*
U.S. Cl. 134—40 10 Claims

1. A method of enhancing grip characteristics of a rubber handle or grip, comprising:

restoring pliability to a rubber handle or grip by applying a grip enhancing material to said handle or grip, said grip enhancing material containing trichloroethane.

4,998,547

VEHICLE WASHER COMMUNICATION SYSTEM

Julian L. Klein, Apopka, Fla., assignor to Ryko Manufacturing Company, Grimes, Iowa

Filed Aug. 31, 1989, Ser. No. 401,975
Int. Cl.[5] B60S *3/04*
U.S. Cl. 134—57 R 1 Claim

1. A vehicle washer comprising, in combination:

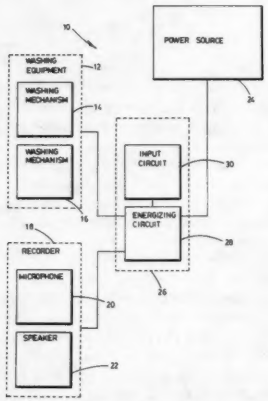
a vehicle washing apparatus providing multiple washing operations;

an electrical power source;

manual input means for enabling a vehicle driver to select multiple manual inputs corresponding to the multiple washing operations;

a message transmitter means including a voice message recorder and a playback device adapted for communicating a message to the vehicle driver, the message notifying the vehicle driver of the availability of unselected multiple washing operations and further permitting the vehicle driver to select previously unselected multiple operations before any of the multiple washing operations begin on the vehicle of the vehicle driver;

input means for receiving multiple manual inputs at different times and responsively providing, after a first set of multiple manual inputs, multiple input signals including a message transmitter activation signal, and further responsively providing, after a second set of multiple manual inputs, multiple input signals including multiple washing operation activation signals, said multiple washing operation activation signals being provided responsively from both said first set of multiple manual inputs and said second set of multiple manual inputs; and



activation means, interconnected to the input means, the power source, the washing apparatus and the message transmitter means, for receiving the multiple washing operation activation signals, and responsively interconnecting the power source and the washing apparatus, the interconnection being to provide one or more of the washing operations dependent on which of the washing operation activation signals is provided, the activation means further for interconnecting the power source and the message transmitter means, the interconnection of the message transmitter means being dependent on receipt of at least one of the washing operation activation signals.

4,998,548

SELF-CLEANING FILTER FOR A DISHWASHER

Dan E. Lagerstrand, Jönköping, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden

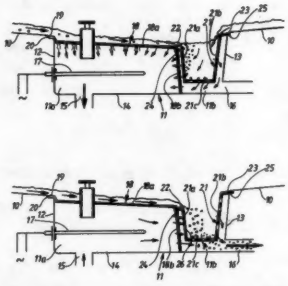
Filed Jan. 4, 1990, Ser. No. 461,092

Claims priority, application Sweden, Jan. 11, 1989, 8900077

Int. Cl.[5] A47L *15/42*

U.S. Cl. 134—111 **8 Claims**

1. A device for a dishwasher having a circulation pump and a drain pump, said device comprising a collector container **(11, 37)** for the dishwater, said container being situated at the bottom of a tub **(27)**, said container communicating with the inlet side **(15, 41)** of the circulation pump and with the inlet side **(16, 45)** of the drain pump **(46)**, wherein said container is divided into two parts, one part forming a chamber **(11*a*)** which at least partly is limited by a fine sieve **(18, 48)** and which communicates with said inlet side **(15, 41)** of the circulation pump, whereas the other part **(11*b*)** is connected to said inlet side **(16, 45)** of the drain pump **(46)**, a micro-filter **(21*a*, 56)** being arranged outside said chamber in such a way that a part of the water circulating to said fine sieve also is allowed to pass through said micro-filter, said fine sieve comprising a first part



(18*a*, 50) sloping downwardly from the bottom of said tub, said first part continuing into a mainly vertical second part **(18*b*, 51)** resting on the bottom of said container.

4,998,549

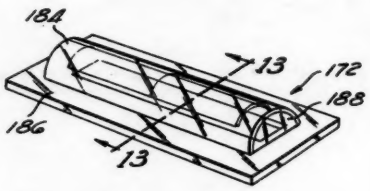
MEGASONIC CLEANING APPARATUS

Mario E. Bran, Garden Grove, Calif., assignor to Verteq, Inc., Anaheim, Calif.

Continuation-in-part of Ser. No. 144,515, Jan. 15, 1988, Pat. No. 4,869,278, which is a continuation-in-part of Ser. No. 43,852, Apr. 29, 1987, Pat. No. 4,804,007. This application Nov. 16, 1988, Ser. No. 272,501

Int. Cl.[5] B08B *3/12*

U.S. Cl. 134—184 **20 Claims**



10. A static megasonic cleaning system, comprising:

a container for cleaning solution and components to be cleaned by megasonic energy;

a megasonic transducer array including a transmitter having an interior surface exposed to the interior of the container and a surface not exposed to the interior of the container, and a transducer bonded to said not exposed surface, said transmitter being adapted to oscillate at a frequency for propagating megasonic energy and being of a material that will efficiently transmit said energy into said container, and said material being hard, durable and relatively inert so as to be able to withstand exposure to cleaning solutions in the container without contaminating the solution;

a source of megasonic energy connected to said transducer to cause said transducer and said transmitter to transmit megasonic energy into the interior of the container, said transmitter being formed to disperse the megasonic energy into a diverging pattern greater in width than that of the transducer, so that said components can be cleaned by said energy without moving; and

said transmitter has a thin walled, curved configuration with a convex surface being said exposed surface, and a concave surface being said not exposed surface, and said

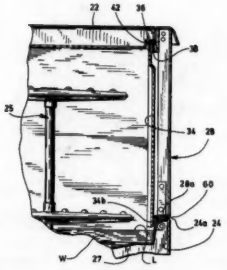
transducer has a thin walled, curved shape with a convex surface bonded to the concave surface of the transmitter and has a concave surface spaced from the transmitter, said transmitter being made of quartz or sapphire.

4,998,550

GASKETLESS DOOR FOR DOMESTIC DISHWASHERS

Jean Archambault, 500 Francois St., Apartment 207, Ile des Soeurs, Canada H3E 1G4

Continuation-in-part of Ser. No. 369,243, Jun. 21, 1989, abandoned. This application Mar. 26, 1990, Ser. No. 498,397
Claims priority, application Canada, Feb. 8, 1989, 590677
Int. Cl.[5] A47L *15/42*
U.S. Cl. 134—200 **2 Claims**



1. A dishwashing machine defining a washing compartment bounded by a top wall, a bottom wall, two side walls and a rear wall, the top, bottom and side walls each defining a front edge section bounding a front quadrangular, vertical opening, a quadrangular door for closing said front opening, a hinge member pivotally interconnecting the bottom edge section of said door to said bottom wall front edge section, a latch member releasably lockingly anchoring the top edge section of said door to said top wall front edge section, water spray means for spraying water inside said washing compartment against said walls in a downwardly outwardly inclined fashion, said bottom wall having drain means for evacuation of water, and male/female labyrinth seal joint means for positively preventing sprayed liquid water produced by said spray means from escaping from said compartment through the periphery of said door once said door is closed, while allowing free air and water vapour circulation between said compartment and ambient air and vice-versa;

wherein said seal means defines a pair of outer and inner spaced parallel ridges, transversely projecting from said door interiorly about the peripheral edge section of the two side edge sections and the top edge section thereof exclusively of the bottom edge section thereof, and spacedly from the corresponding edges thereof, and a generally U-shape groove or channel, made thicknesswisely of said front edge sections of said dishwasher two side walls and top wall and spaced from the corresponding edges thereof; wherein when said door is closed and locked by said latch member, said outer ridge engages into said channel without contacting said dishwasher side walls or top wall while said inner ridge extends freely into said washing compartment proximate the inner face of the corresponding dishwasher side wall or top wall; wherein a tortuous labyrinth seal passage following the contour of said ridges is defined, said passage having a thickness of about 1/32th of an inch so as to allow water vapour and air to circulate therethrough while positively preventing passage of the liquid water being sprayed by said spray means.

4,998,551

UMBRELLA WITH CANOPY ROTATOR JOINT

James G. DeSarno, Interlaken, N.J., assignor to Winpro Industries, Interlaken, N.J.

Filed Jan. 30, 1989, Ser. No. 302,984
Int. Cl.[5] A45B *11/00*
U.S. Cl. 135—20 R **4 Claims**

1. An umbrella comprising:

a canopy;

a center pole having an upper end coupled to a center of said canopy for supporting said canopy;

a first sleeve slidably mounted on said center pole;

a plurality of outer ribs extending outwardly from said center of said canopy and forming a frame for said canopy;

a plurality of intermediate ribs each connected at one end to a corresponding one of said outer ribs and connected at another end to said first sleeve to support said outer ribs and open and close said canopy;

a handle coupled to a lower end of said center pole; and

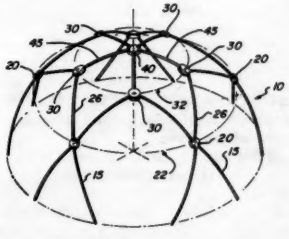
rotational joint means, connected between said handle and said center pole, for rotatably supporting said canopy relative to said handle, whereby when said canopy is subject to a torsional force, said canopy and said center pole rotate relative to said handle, said rotational joint means comprising a second sleeve fixedly and concentrically attached to said center pole, and a hub fixedly and concentrically attached to said handle, said second sleeve being rotatably mounted to said hub, wherein said second sleeve has a longitudinal aperture in receipt of said center pole, said hub comprises a longitudinal shaft, and said handle has a longitudinal aperture in receipt of said longitudinal shaft of said hub and wherein said hub has an annular recess, and said second sleeve has an annular, inner notch which is rotatably mounted in said annular recess of said hub.

4,998,552

GEODETIC TENT STRUCTURE

Mark R. Niksic, Lakewood, Colo., and Mark E. Erickson, Oakland, Calif., assignors to T. A. Pelsue Company, Englewood, Colo.

Filed Sep. 12, 1989, Ser. No. 406,233
Int. Cl.[5] E04H *15/36*
U.S. Cl. 135—102 **4 Claims**



1. A self supporting collapsible tent structure comprising:

a planar tension bearing polygonal-shaped floor member

having a defined perimeter and comprising a first tent level;

a plurality of hub members each carrying a plurality of sockets which are pivotal about axes which are co-planer and which axes are interrelated one to the other as the sides of a polygon;

a first series of said hub members disposed in a plane at a second tent level which is spaced apart from said first tent level and whose sockets are pivotal in a first direction;

a second series of said hub members disposed in a plane at a third tent level which is spaced apart from said second tent level and whose sockets are pivotal in a second direction, opposite to the said first direction;

an apex-forming hub member disposed at a fourth tent level which is spaced apart from said third tent level and whose sockets are pivotal in said first direction;

a first plurality of compression rods, the ends of which are seated in the said sockets of the hub members, and which interconnect the hub members in polygonal planes defined and bounded by the rod members; and

a second plurality of compression rods, one end of which are seated in sockets of the hub members at the second tent level and the other end of which are connected to the perimeter of the floor member.

4,998,553

CONTROLLING PARTICULATE MATERIAL

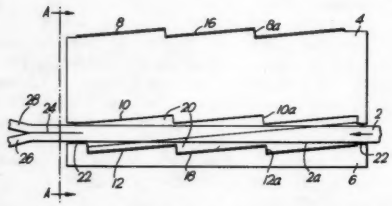
Cornelius J. Schram, Pavenham, England, assignor to National Research Development Corporation, London, England

Filed Jan. 5, 1990, Ser. No. 461,525

Claims priority, application United Kingdom, Jan. 6, 1989, 8900274

Int. Cl.[5] F15C *1/04*

U.S. Cl. 137—13 **9 Claims**



1. A method for controlling the movement of particulate material in a liquid, said method comprising the steps of:

producing a flow of the particulate-carrying liquid,

providing a boundary for said flow extending in the direction of flow,

establishing a standing wave having a series of nodal fronts extending transversely to an axis of the standing wave and being spaced apart from each other in the direction of said axis, said nodal fronts extending obliquely to the direction of flow of the liquid with the angle of obliquity being substantially less than 45°, thereby bringing particles of said particulate material on the nodal fronts towards said boundary along which the flow runs.

4,998,554

FOOD PASTEURIZATION SYSTEM VACUUM BREAKER

Ronald J. Rogers, Fredericksburg, Iowa, assignor to Vacu-Purg, Inc., Fredericksburg, Iowa

Filed Sep. 16, 1988, Ser. No. 246,632

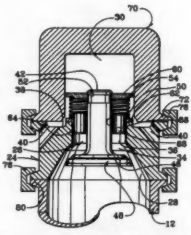
Int. Cl.[5] F16K *24/00*

U.S. Cl. 137—217 **4 Claims**

3. A food pasteurization system including a raw material supply connected by a conduit to a pasteurization unit connected to a processed food holding tank, and a vacuum breaker positioned in said conduit between said supply and holding tank wherein the improvement includes said vacuum breaker comprising:

a valve body having a vertical passageway extending therethrough, between said conduit at its lower end and a chamber in communication with the atmosphere at its upper end, a valve seat in said passageway, said chamber having a normal pressure approximately equal to the atmospheric pressure, said valve body having oppositely disposed annular flanges at its lower and upper ends, said upper end including an annular channel having a drain opening in communication with the atmosphere and positioned at least as low as the upper end of said passageway whereby all material flowing upwardly through said passageway from said conduit is drained from said annular channel,

a cover having said chamber therein and an annular flange



positioned on the upper end of said valve body with said cover flange matingly engaging said upper end valve body flange and locking means releasably locking said cover and upper body flanges together and said conduit having an annular flange in mating engagement with the valve body lower end annular flange and locking means releasably locking said conduit and lower end valve body annular flange together,

a valve element movable between open and closed positions in said passageway with said valve element engaging said valve seat when said valve element is in said closed position, and

said valve element adapted for closing said passageway but being able to move to an open position when pressure in said conduit is reduced relative to said atmospheric pressure thereby allowing air pressure equalization to occur in said conduit.

4,998,555

ACCESSORY FAUCET

Dirck Barhydt, Sr., 273 South St., Middlebury, Conn. 06762, and Frank J. Agresta, 22 Partridge Run, Wallingford, Conn. 06492

Division of Ser. No. 448,526, Dec. 11, 1989, Pat. No. 4,967,784.

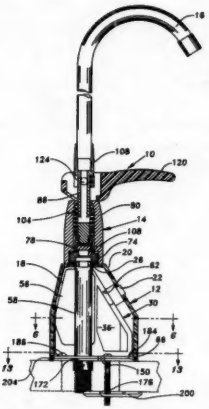
This application May 18, 1990, Ser. No. 525,069

Int. Cl.[5] F16K *21/00*; E03C *1/02*

U.S. Cl. 137—359 **3 Claims**

1. A freely swivelly adjustable in-line accessory faucet, comprising in combination a threaded pipe for connection to a water inlet; a faucet outlet; the threaded pipe and the faucet outlet having a common central axis; a hollow valve housing positioned between the threaded pipe and the faucet outlet; a valve seat threadedly connected to the threaded pipe, means connecting the valve housing to the valve seat; the valve seat having a central opening in water-flow communication with the threaded pipe; valving means within the valve housing to control water passage from the threaded pipe to the faucet outlet; a handle to operate the valving means and having first and second lower camming surfaces separately engageable with the housing; means to hold the accessory faucet in assembled condition on a sink lip or the like; the valving means comprising a one-piece valve stem centrally located within the valve housing and spaced from the valve housing interior wall;

said valve stem having an inwardly tapered lower end, and a cup-shaped valve element snugly but rotatably receiving the tapered lower end of the stem, the valve element having gasket material on its bottom surface engageable with the valve seat, the stem having a central water-flow conduit in its upper portion, and at least one opening through the valve stem side wall connecting the space between the valve stem and the housing interior wall to the central conduit in the upper valve stem portion; spring means within the housing biasing the valve stem so that the valve element engages the valve seat;



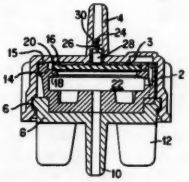
said valve stem upper portion being connected to the faucet outlet; and means connecting the handle to the faucet outlet; whereby, when the handle is actuated it lifts the faucet outlet and valve stem against the spring bias away from the valve seat to permit the valve element to rise and water to flow from the threaded pipe over the valve seat, into the space between the valve stem and housing interior wall, through the opening in the valve stem side wall into the central conduit in the upper valve stem portion, and out the faucet outlet and whereby the faucet outlet is freely swivelable as the valve stem and the valve element rotate relatively.

4,998,556

DRIP EMITTER

Dan Bron, 36 Palmach St., Haifa, Israel

Continuation-in-part of Ser. No. 21,494, Mar. 4, 1987, Pat. No. 4,796,660. This application Dec. 7, 1988, Ser. No. 280,971
Claims priority, application Israel, Mar. 5, 1986, 78045
Int. Cl.[5] F16K *31/365*
U.S. Cl. 137—501 **4 Claims**



1. In an adjustable-rate, flow regulated, constant-output emitter comprising:

an inverted-cup-shaped connector piece connectable to a source of relatively high-pressure liquid and having substantially cylindrical walls and a downward-facing bottom surface provided with an inlet port,

a head piece rotatably engaging said connector piece;

an intermediate member having an outlet port, said member being interposed between, and rotatable relative to either of, said connector piece and said head piece,

an elastically deformable diaphragm at least the radial position of which is maintained by small member and which diaphragm defines with its upper surface a first chamber comprising said inlet port, and with its lower surface a second chamber comprising said outlet port;

passageway means leading from said first chamber via said member into said second chamber, said passageway means including at least one first portion in which flow is relatively unobstructed as well as at least one second portion in which flow is relatively restricted, the restrictive effect of which second portion determines the flow rate of said emitter, which restrictive effect can be varied by means of a rotary displacement of one of said pieces relative to the other,

an improvement comprising:

a flow-regulating valve comprised of a valve head accessible to said high-pressure liquid and a valve stem one end of which is attached to, or integral with, said valve head, and

a valve seat associated with said valve head and located in a high-pressure region upstream of said first chamber, said valve seat and said valve head defining between them a gap through which the liquid passes on its way from said high-pressure source into said first chamber,

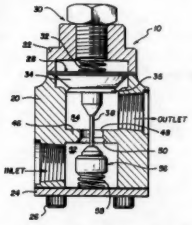
wherein said valve head is adapted to be acted upon by a first force tending to reduce said gap, and by a second force tending to increase said gap, a state of equilibrium between said forces defining the set point of said flow-regulated emitter, wherein during operation, the maximum opening size of said gap defined by said valve head and said valve seat is smaller then the maximum opening provided by the flow-restrictive portion of said flow-restrictive passageway.

4,998,557

PLUNGER-TYPE FUEL PRESSURE REGULATOR

Gregg W. Koechlein; Werner O. Wizemann, and Ted D. Deeds, all of Carson City, Nev., assignors to Mallory, Inc., Carson City, Nev.

Filed Jun. 27, 1990, Ser. No. 544,428
Int. Cl.[5] G05D *16/02*
U.S. Cl. 137—505.42 **8 Claims**



1. In a pressure regulator for use in feeding the output of a relatively high pressure and relatively large liquid volume pump means to a point of use requiring, under some operating conditions, only a relatively small portion of the output volume of said pump means and a substantial reduction of said relatively high pressure, said pressure regulator being of the back pressure diaphragm means operated type, said pressure regulator comprising a body formed with an inlet chamber and an outlet chamber, wall means between said inlet and outlet chambers, and a valve seat formed with a conical sealing surface formed in said wall means, the improvement comprising a throttling and sealing member in the form of a plunger, said plunger comprising a nose portion defined by a conical surface, the included angle defining said valve seat conical surface being larger than the included angle defining said nose portion

conical surface, an "O"-ring groove formed in said nose portion, an "O"-ring in said "O"-ring groove, the shapes and sizes of said "O"-ring and said "O"-ring groove being such that said "O"-ring protrudes beyond said nose portion conical surface in the unsealed condition of said plunger with respect to said valve seat a relatively very small distance, the shapes and sizes of said nose portion and of said valve seat being such that portions of said nose portion contact said valve seat to form the primary seal against flow through said valve seat, and any seal formed between said "O"-ring and said valve seat is a secondary seal.

4,998,558

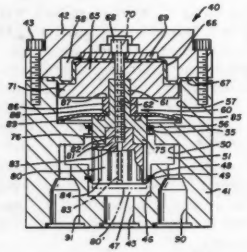
SOLAR WATER HEATING SYSTEM

Fred D. Solomon, 979 Meadow Park Dr., Akron, Ohio 44313

Division of Ser. No. 234,511, Aug. 22, 1988, Pat. No. 4,917,079. This application Feb. 5, 1990, Ser. No. 475,292

Int. Cl.[5] F16K *31/363*

U.S. Cl. 137—510 **7 Claims**



1. An atmospherically sealed regulating valve initially opening to pass fluid at a minimum selected pressure and remaining open to pass fluid until the fluid pressure reaches a selected reduced pressure comprising, housing means, cap means enclosing the open end of said housing means, valve element means movable axially in said housing means, first chamber means in said housing means axially surrounding one end of said valve element means, second chamber means in said housing means axially surrounding the other end of said valve element means, bore means extending through said valve element means connecting said first chamber means and said second chamber means, fluid inlet passage means supplying fluid to said first and second chamber means, third chamber means in said housing means communicating with fluid outlet passage means, and biasing means permitting movement of said valve element means for fluid communication between said first chamber means and said third chamber means at the minimum selected pressure in said fluid inlet passage means and effecting movement of said valve element means for interrupting fluid communication between said first chamber means and said third chamber means at the selected reduced pressure said biasing means being a spring washer that is a bowed flexible annular member interposed between a circular seat within said housing means and the juncture of a body portion of said valve element means and an enlarged guide section.

4,998,559

SOLENOID OPERATED PRESSURE CONTROL VALVE

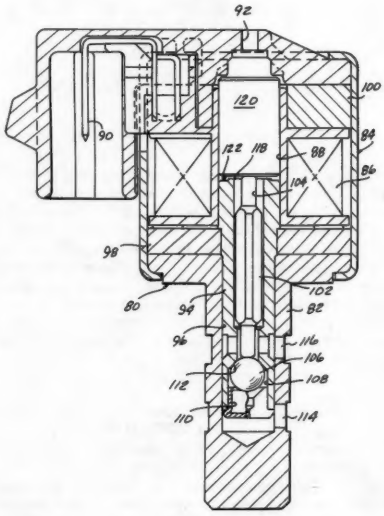
Lawrence McAuliffe, Jr., Southfield, Mich., assignor to Coltec Industries Inc., New York, N.Y.

Division of Ser. No. 243,679, Sep. 13, 1988, abandoned. This application Jan. 29, 1990, Ser. No. 471,709

Int. Cl.[5] F15B *13/044*

U.S. Cl. 137—596.17 **2 Claims**

1. A solenoid actuated fluid pressure control valve comprising a housing having a central passage extending vertically downwardly from a first port adapted to be connected to a fluid sump and located at the upper end of said housing to a second port adapted to be connected to a source of fluid pressure and located adjacent the lower end of said housing, a solenoid coil mounted withn said housing intermediate the upper and lower ends thereof in coxial relationship with said central passage, an elongate tubular valve body sealingly seated in said central passage with the upper end of said valve body projecting above the lower end of said coil and the lower end of said body located above said second port, a flow passage extending through said valve body from a lower downwardly facing frusto conical valve seat opening into said central passage at the lower end of said body to an upper upwardly facing valve seat at the upper end of said body opening into said central passage at the upper end of said body, means defining a third port in said housing in constant fluid communication with said flow passage at a location between said upper valve seat and said lower valve seat, a ball located in said flow passage between and said lower valve seat and said second port operable when seated against said lower valve seat to block fluid communication between said second port and that portion of said flow passage above said lower valve seat, a solenoid armature received in said central passage between said



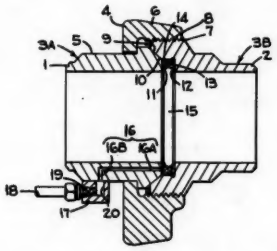
upper valve seat and said first port and having means at its lower end operable when engaged with said upper valve seat to block fluid communication between said flow passage and that portion of said central passage above said upper valve seat, said armature being adapted to accommodate a substantially unrestricted flow of fluid past said armature through that portion of said central passage between said valve body and said first port, a push rod loosely slidably received in said flow passage having a lower end projecting through said lower valve seat into engagement with said ball and an upper end projecting through said upper valve seat into engagement with the lower end of said armature, the length of said push rod being such as to hold said armature clear of said upper valve seat when said ball is seated against said lower end seat and to hold said ball clear of said lower valve seat when said armature is engaged with said upper valve seat, said ball being normally maintained seated against said lower valve seat by fluid pressure of said source connected to said port and said armature being movable into engagement with said upper valve seat in response to energization of said solenoid coil.

4,998,560

FLUID LOADING ARM EMERGENCY DISCONNECTION SYSTEM

Eugene Le Devehat, Saligny, France, assignor to FMC Corporation, Chicago, Ill.

Continuation of Ser. No. 433,878, Nov. 9, 1989, abandoned. This application Jul. 9, 1990, Ser. No. 549,655
Claims priority, application France, Nov. 9, 1988, 88 14646
Int. Cl.[5] A16L *3/00*
U.S. Cl. 137—616 7 Claims



3. A fluid loading arm adapted to be connected to a tank where the arm or the tank is carried by a mobile vehicle, the arm comprising:

(a) a safety disconnector for disconnecting the arm and the tank in the event of untimely departure of the vehicle, said disconnector comprising two pipe elements each containing a valve that is normally closed and that opens when said pipe elements are placed into connected condition;

(b) means for sensing a connection between the loading arm and the tank;

(c) means for sensing a predetermined angular configuration of the loading arm;

(d) means for unlocking the safety disconnector; and

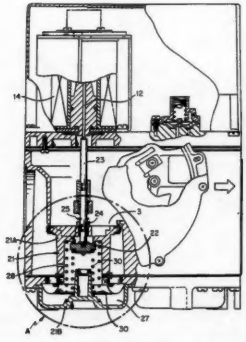
(e) means for actuating the unlocking means simultaneously senses said connection and said predetermined configuration.

4,998,561

FLOW CONTROL VALVE

Eiichi Morozumi; Takashi Tsumura, and Hiroyuki Inagaki, all of Kanagawa, Japan, assignors to Yamatake-Honeywell Co. Ltd., Tokyo, Japan

Filed Dec. 5, 1989, Ser. No. 446,376
Claims priority, application Japan, Dec. 29, 1988, 63-332444
Int. Cl.[5] F16K *1/32*
U.S. Cl. 137—630.14 6 Claims



1. A flow control valve comprising:

a main valve means for opening and closing a fluid conduit, said fluid conduit having a primary side and a secondary side;

a driving means for driving said main valve means;

a diaphragm coupled to said main valve means;

a sub-valve chamber defined by said main valve means and said diaphragm;

a sub-valve mans incorporated in said main valve means for opening and closing said sub-valve chamber to a conduit in said secondary side;

a projection, protrusively formed on a driving shaft of said driving means, responsive to a driving force of said driving means for sliding said sub-valve means by a predetermined stroke to bring the same in a fully opened state with said main valve means remaining in a closed state and thereafter opening said main valve means;

a bleed orifice means provided through a side wall of said main valve mans for allowing the pressure in said sub-valve chamber to rise to a pressure equal to that of said primary side of said conduit when said sub-valve means is closed; and

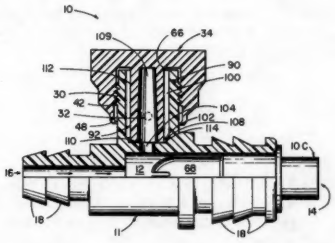
a returning spring means for urging each of said main valve means and said sub-valve means in the closing direction.

4,998,562

FLOW CONTROL VALVE

Carl L. Foltz, Clearwater, Fla., assignor to Halkey-Roberts Corporation, St. Petersburg, Fla.

Continuation-in-part of Ser. No. 867,238, May 23, 1986, Pat. No. 4,744,391. This application May 9, 1988, Ser. No. 191,701
Int. Cl.[5] F16K *31/50*
U.S. Cl. 137—877 7 Claims



1. A flow control valve, comprising in combination:

a body having a bleed fluid passageway and an axial fluid passageway having an input and output;

said bleed fluid passageway including a lumen and a bottommost surface, said bottommost surface including a substantially cylindrical recess having a bottom surface and an inner wall defining an inner diameter;

an output hole positioned in said recess in fluid communication with said axial fluid passageway;

a bleed hole positioned through said bleed fluid passageway;

a bleed cap threadably engaging said bleed fluid passageway; and

a bleed valve element positioned within said bleed fluid passageway, said bleed valve element comprising an elongated configuration having a length appreciably greater than the length of said bleed fluid passageway and a substantially cylindrical distal end having an outer diameter less than said inner diameter, whereby, upon movement of said bleed cap, said distal end moves from its seated engagement with said bottom surface of said recess to a first bleed position within said recess and, upon further movement of said bleed cap, said distal end moves out of said recess to a second bleed position.

4,998,563

PLASTIC PIPE

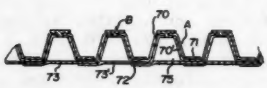
Akio Nagayoshi, and Kiyoharu Nagayoshi, both of Sakai, Japan, assignors to UC Industry Co., Ltd., Osaka, Japan

Continuation of Ser. No. 292,075, Dec. 30, 1988, abandoned, Division of Ser. No. 163,687, Mar. 3, 1988, Pat. No. 4,824,502. This application Feb. 13, 1990, Ser. No. 479,899

Claims priority, application Japan, Mar. 6, 1987, 62-52289; Mar. 6, 1987, 62-52290; Apr. 21, 1987, 62-98372; Jun. 9, 1987, 62-144459

Int. Cl.[5] F16L *11/08*

U.S. Cl. 138—122 6 Claims



1. A plastic pipe having a spiral ridge on an outer surface and a continuous, cylindrical inner surface, constituted by an elongated plastic ribbon spirally wound and comprising at least one ridge-shaped hollow deformation extending longitudinally of said elongated ribbon and, spirally and outwardly of said continuous, cylindrical inner surface and provided with a slit extending longitudinally of said elongated ribbon and through an outer,. radial surface of said spiral ridge hollow ridge-shaped deformation, a first side portion extending on one side of said ridge-shaped deformation and a second side portion extending on the other and opposite side of said ridge-shaped deformation, said first and second side portions adjacent plastic ribbon spirals being fused with each other in said continuous, cylindrical inner surface so that said fused portions form said continuous, cylindrical, inner surface and cover the bottom of said hollow ridge-shaped deformation, said longitudinal slit being sealed with a second plastic ribbon fused to the exterior of said spiral ridge.

4,998,564

REFRIGERANT-TRANSPORTING HOSE

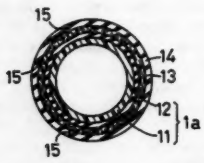
Ichiro Igarashi, Komaki, and Hiroaki Ito, Inuyama, both of Japan, assignors to Tokai Rubber Industries, Ltd., Aichi, Japan

Filed May 30, 1989, Ser. No. 357,816

Claims priority, application Japan, Jun. 6, 1988, 63-138916

Int. Cl.[5] F16L *9/14*

U.S. Cl. 138—126 13 Claims



1. A refrigerant-transporting hose comprising:

an elastic tube through which a refrigerant is transported, said elastic tube including a tubular resinous layer formed of a resinous composition, said resinous composition containing as a major component thereof a polyamide resin produced by reaction of hexamethylene diamine and an aliphatic dicarboxylic acid compound having from eight to sixteen carbon atoms, said resinous composition further containing saponified ethylene-vinyl acetate copolymer.

4,998,565

REINFORCED HOSE

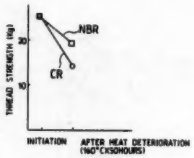
Yuji Kokuryu, and Hiroshi Yamaguchi, both of Aichi, Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

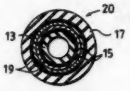
Filed Mar. 13, 1989, Ser. No. 322,570

Claims priority, application Japan, Mar. 15, 1988, 62-33945[U]; Nov. 10, 1988, 63-146760[U]

Int. Cl.[5] F16L *9/14*

U.S. Cl. 138—126 7 Claims





1. A reinforced hose, comprising:

an inner pipe layer;

an intermediate reinforcing layer; and

an outer pipe layer,

wherein each of said inner and outer pipe layers is made of synthetic rubber having a polarity at least at the surface thereof in contact with said intermediate reinforcing layer, and wherein said intermediate reinforcing layer comprises reinforcing fibers individually coated with one of nitrile rubber and a blended material of nitrile rubber and a high-molecular material to provide a means to prevent the fibers from being shifted from one another and to improve the adhesiveness of the intermediate reinforcing layer to the inner and outer pipe layers.

4,998,566

LIQUID WARP SPLICING SYSTEM FOR A WARP IN A LOOM

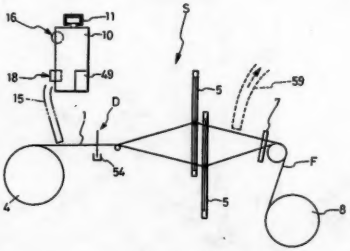
Yasuo Akiyama, Kyoto, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Mar. 24, 1989, Ser. No. 328,565

Claims priority, application Japan, Mar. 30, 1988, 63-76682; Apr. 13, 1988, 63-90828; Apr. 14, 1988, 63-91919

Int. Cl.[5] D03J *1/16;* B65H *69/06*

U.S. Cl. 139—35 9 Claims



1. A yarn splicing system operable with a loom having a row of warps, the system comprising:

search means for finding a yarn end on the warp beam side of a severed warp; and

splicing means for splicing the found yarn end with one end of an additional yarn;

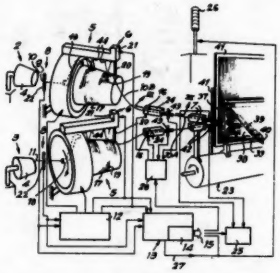
wherein said splicing means comprises an additional yarn package for splicing, a liquid tank for removing size of a sized yarn, and a splicing device for splicing said additional yarn with a cut warp.

4,998,567

WEFT THREAD BREAK DETECTOR WITH A TIME DELAY CIRCUIT

Henry Shaw, Vleteren, Belgium, assignor to Picanol, N.V., Belgium

Filed Dec. 5, 1989, Ser. No. 446,152
Claims priority, application Belgium, Dec. 5, 1988, 08801361
Int. Cl.[5] D03D *47/34, 51/34*
U.S. Cl. 139—116.2 **16 Claims**



1. A weft thread supply for an airjet weaving machine, comprising:

a plurality of thread preparation mechanisms each of which performs the task of thread preparation and includes at least one yarn package, a thread accumulator mechanism, a thread blocking device, and means including a main nozzle for inserting weft thread into a shed of the weaving machine;

detection means for sensing thread breaks in at least one weft thread, said detection means being mounted between corresponding yarn packages and thread blocking devices of said at least two thread preparation mechanisms;

a control unit connected to the detection means and the thread preparation mechanisms which includes means for deactivating one of said thread preparation mechanisms and transfering its task to another of said thread preparation mechanisms;

a control device connected to the detection means, said device including time delay circuit means for supplying an output signal for further processing at a predetermined time interval after the detection means has sensed a thread break;

and thread removal means connected to the time delay circuit means and activated by the output signal for removing at least a section of weft thread extending into the main nozzle.

4,998,568

DOUBLE LAYERED PAPERMAKING FABRIC WITH HIGH PAPER SIDE CROSS THREAD DENSITY

Fritz Vöhringer, Heidenheim, Fed. Rep. of Germany, assignor to F. Oberdorfer GmbH & Co. KG Industriegewebe-Technik, Heidenheim, Fed. Rep. of Germany

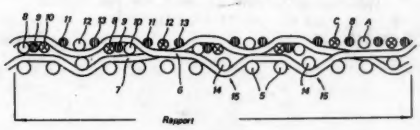
Filed Apr. 8, 1988, Ser. No. 179,564
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1987, 3713510
Int. Cl.[5] D21F *7/10*
U.S. Cl. 139—383 A **15 Claims**

1. A double layered papermaking wire comprised of a paper side and a running side;

wherein said paper side comprises a set of weft threads;

wherein said running side comprises a set of weft threads and a set of warp threads;

said set of weft threads on said paper side further comprising three groups of weft threads, A, B and C, said threads differing from one another in material, diameter and floating length in a weave pattern;



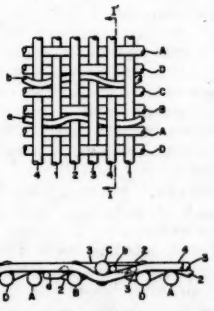
wherein said weave pattern on said paper side comprises a warp thread crossing over said three succeeding weft threads, thereafter crossing under a succeeding said three succeeding weft threads, thereafter crossing over a succeeding said three succeeding weft threads, thereafter extending between said weft threads on said paper side and said weft threads on said running side and interlacing at least one weft thread on said running side.

4,998,569

SINGLE-LAYER PAPERMAKING BROKEN-TWILL FABRIC AVOIDING WIRE MARKS

Takuo Tate, Tokyo, Japan, assignor to Nippon Filcon Co., Ltd., Tokyo, Japan

Filed Aug. 29, 1989, Ser. No. 399,216
Claims priority, application Japan, Aug. 30, 1988, 63-213684
Int. Cl.[5] D03D *13/00*
U.S. Cl. 139—383 A **12 Claims**



1. A papermaking single-layer fabric comprising a broken-twill woven fabric having a paper side and a running side formed of warps and primary and auxiliary wefts and having more than four shafts in each repeating unit, said running side formed of long crimped primary wefts, where in a repeating unit, an auxiliary weft, having a smaller diameter than the primary weft, is disposed between two of said primary wefts and over two adjacent warps at a location where one of two said adjacent warps extends from the paper side over one of said two primary wefts toward the running side to extend

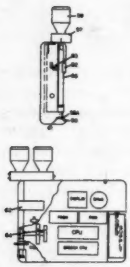
under the second of said two wefts and the second of said adjacent warps extends from the running side under said one of the two primary wefts toward the paper side over the second of said primary wefts, said two adjacent warps crossing each other between said two primary wefts, said auxiliary weft being woven at least once to be over said two adjacent warps and under the remaining warps in said unit.

4,998,570

FILLING DEVICE WITH SOUND INDICATOR FOR FILLING INJECTION SYRINGE

Bernard Strong, Tarzana, Calif., assignor to Pavel Jordan & Associates, Garden Grove, Calif.

Division of Ser. No. 212,210, Jun. 27, 1988, Pat. No. 4,883,101. This application Nov. 22, 1989, Ser. No. 440,983
Int. Cl.[5] A61M *5/00*; B65B *3/32*
U.S. Cl. 141—27 **6 Claims**



1. A filling device for a syringe, including barrel and stem portions, comprising a case portion, and including:

movable holding means for releasably securing the stem portion of the syringe, and adapted to load or unload the syringe by movement of the stem portion;

a linear gear, including gear teeth attached to the holding means, and adapted to move the holding means;

a rotary encoding switch mounted by the case portion for actuating the linear gear;

a microprocessor, and a sounding element connected thereto, the microprocessor being connected to the encoding switch and adapted to actuate an audible tone, or an artificial voice from the sounding element;

a locking arm mounted on the filling device and adapted to secure the syringe against movement when the syringe stem portion is moved to load or unload the syringe, the locking arm being adapted to release the syringe after loading; and,

means for detachably mounting to the filling device a bottle containing liquid medicine for loading or unloading by the syringe; whereby:

movement of the encoding switch in one direction actuates the linear gear and causes the holding means to load the syringe with liquid medicine from the medicine bottle, and movement of the encoding switch in an opposite direction actuates the linear gear to cause the holding means to unload liquid medicine into the bottle; and,

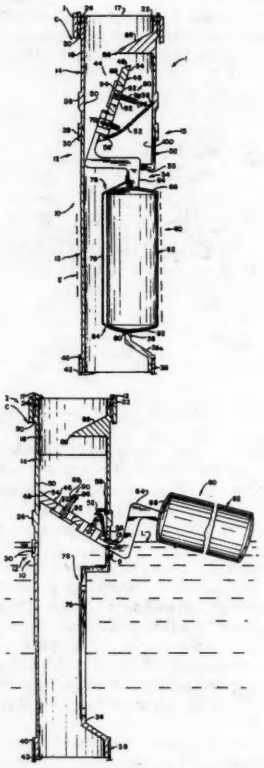
movement of the encoding switch transmits a signal to the microprocessor, thereby producing a sound from the sounding element coinciding with an increment of movement of the encoding switch, corresponding to an increment of movement of an individual gear tooth of the linear gear, each sound being equivalent to a predetermined amount of liquid medicine loaded or unloaded by the syringe.

4,998,571

OVERFILL VALVE APPARATUS

Barry M. Blue, and James P. Blue, both of P.O. Box 267, Hannibal, Mo. 63410

Filed Dec. 29, 1989, Ser. No. 458,902
Int. Cl.[5] F16K *31/18*
U.S. Cl. 141—198 **20 Claims**



1. An overflow valve apparatus for use in a liquid storage container having a fluid inlet, comprising:

an enclosure defining an envelope for insertion in said fluid inlet, said enclosure including a fill pipe;

valve means moveably mounted in the fill pipe, said valve means including a valve head moveable between at least a first open pipe position and a second, closed pipe position;

float means attached to the said valve head and movable from a first position when the container is empty to a second position as the container fills with liquid, movement of the float means toward its second position producing movement of the valve head toward its second position, the float means also being movable within the envelope defined by said enclosure, said envelope having a diameter which is less than the diameter of said fluid inlet to permit installation and removal of said valve apparatus; and,

closure means defining at least a portion of the enclosure for said valve, said closure means being inwardly flexible to accommodate the float means during pipe installation and removal, and outwardly flexible during fluid flow to conform to a predetermined configuration of said enclosure so

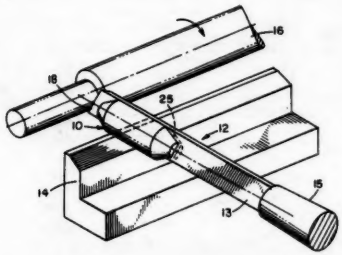
as to present a substantially uniform, non-flow restrictive path for such flow.

4,998,572

CHISEL STABILIZER FOR WOOD TURNING TOOL

Richard Lukes, 440 Beach St., Los Angeles, Calif. 90065

Filed Aug. 4, 1989, Ser. No. 389,494
Int. Cl.[5] B27C *7/06*; B23B *29/12, 29/22*
U.S. Cl. 142—55 **21 Claims**



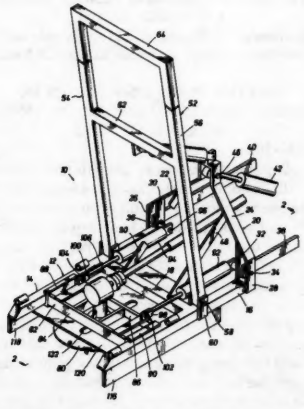
1. A wood turning tool support, for use with a lathe having a fixed tool rest and with a wood turning tool having a flat bar including a cutting blade at one end and having a handle attached to the bar, comprising a generally cylindrical stabilizer body having an exterior surface for rotatably contacting the tool rest and an interior portion for fixedly attaching to the flat bar of the tool, the stabilizer body encircling at least one side edge of the flat bar of the tool such that the lengthwise axis of the stabilizer body is parallel to the lengthwise axis of the bar, and the body is spaced back from the cutting blade of the tool, the interior portion and the exterior surface being relatively located and configured to facilitate the tool and stabilizer body to be rotated on the fixed tool rest of the lathe about the same longitudinal axis to substantially vertically align the point of contact of the cutting blade on the wood and the point of contact of the stabilizer body on the tool rest.

4,998,573

TREE CUTTING APPARATUS

Norman N. York, P.O. Box 262364, Houston, Tex. 77207

Filed Nov. 17, 1989, Ser. No. 439,285
Int. Cl.[5] A01G *23/08*
U.S. Cl. 144—34 R **12 Claims**



1. Tractor supported and operated tree cutting apparatus, comprising:

(a) a frame structure adapted to be supported, raised and lowered by a hitch structure of the tractor;

(b) slide means positioned for guided reciprocal movement on said frame structure;

(c) hydraulic means for imparting linear reciprocal movement to said slide means;

(d) drive shaft means mounted for rotary movement on said frame structure and adapted to be driven by the power takeoff of the tractor;

(e) a rotary cutter rotatably supported by said slide means and moveable along with said slide means, said rotary cutter being rotated by said drive shaft means and capable of simultaneous linear movement, wherein said rotary cutter is horizontally oriented for cutting a tree at or below level; and

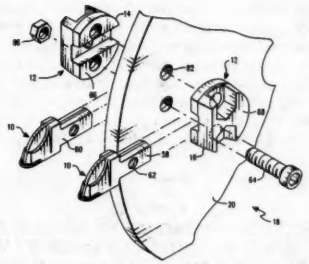
(f) wherein said rotary cutter is substantially enclosed by a cover plate and sidewalls mounted on said frame structure, said cover plate including a longitudinally extending slot formed therein permitting said rotary cutter to be advanced relative thereto.

4,998,574

CUTTING BIT AND BLOCK MOUNT

Wayne H. Beach, Roaring Spring, and Steven D. Shivk, Altoona, both of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Continuation-in-part of Ser. No. 444,659, Dec. 1, 1989, abandoned. This application Jun. 1, 1990, Ser. No. 534,019
Int. Cl.[5] B27G *13/04*
U.S. Cl. 144—241 **37 Claims**



1. A cutting bit comprising:

a working head having a front cutting edge; and

a shank depending from said working head, said shank having side portions and forward and rearward edges and a pin retaining inner recess spaced from said edges extending transverse to a direction of travel of said cutting bit within at least one of said side portions.

4,998,575

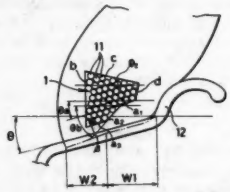
HEAVY LOADING TUBLESS TIRE WITH DEFINED POLYGONAL SECTION BEAD CORE

Masahiko Kanamaru, Zushi, Japan, assignor to The Yokohama Rubber Co., Ltd., Tokyo, Japan

Filed Jul. 20, 1989, Ser. No. 382,449
Claims priority, application Japan, Jul. 28, 1988, 63-186744
Int. Cl.[5] B60C *15/04*
U.S. Cl. 152—540 **4 Claims**

1. A heavy loading tubeless tire of the type including a bead portion to be fitted on an inclined base of a wheel rim, comprising: a bead portion which has a buried bead core bundled of a plurality of bead wires and having a polygonal section contour and which has a bead base composed of two regions: a region W_1 located at the side of a bead heel and inclined at an angle substantially equal to an angle θ of inclination of the wheel rim base with respect to the axis of tire rotations; and a region W_2 located at the side of a bead toe and inclined at a larger angle than said angle of inclination of the wheel rim base with re-

spect to the axis of tire rotations, wherein the improvement resides: in that the width of the region W_2 at the side of said bead toe measured in the axial direction of tire rotations is within a range of 30 to 70% of the total width of the bead base measured in the axial direction of tire rotations whereas the width of said bead core measured in the axial direction of tire rotations is at least 40% as large as the total width of said bead base; and in that the polygonal contour of said bead core is composed of a bottom side a_1, which is located at the side of the bead heel and inclined at an angle θa substantially equal to the inclination angle of the bead base in said region W_1 relative to the axis of tire rotations, a bottom side a_2, which is located to merge into said bottom side a_1 and inclined at an angle θb larger than the inclination angle of the bead base in said region



W_1 relative to the axis of tire rotations, a bottom side a_3, which is located at the side of the bead toe and inclined at an angle substantially equal to the angle of inclination of said bottom side a_1 and which merges into said bottom side a_2 such that a convex portion of the bead core, defined by said bottom sides a_2 and a_3 and a radially inner portion of an inner side b extending radially outward of the tire from the end portion of said bottom side a_3 at the side of the bead toe, projects inward toward said bead base from an axially inward extension of said bottom side a_1, and an upper side c opposed to said bottom side a_1, said upper side c being disposed at an angle of inclination (θ_2) with respect to the axis of tire rotations that is of an inclination that is smaller than and opposite to the angle of inclination (θ_2) of said bottom side a_1 relative to the axis of tire rotations.

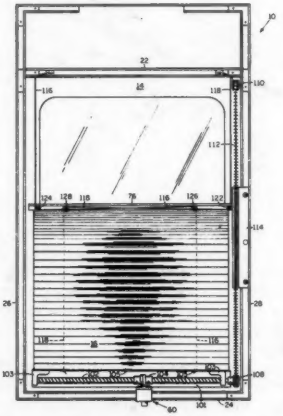
4,998,576

REVERSING SCREW, AIRCRAFT WINDOW SHADE MECHANISM FOR A MODULAR AIRCRAFT WINDOW

Gilbert C. Moreno, San Antonio, Tex., assignor to MSA Aircraft Interior Products, Inc., San Antonio, Tex.

Filed Sep. 29, 1989, Ser. No. 415,016
Int. Cl.[5] E06B *3/32*
U.S. Cl. 160—90 **10 Claims**

1. A modular window insert unit for use in the cabin of an aircraft or other vehicle, comprising:
means defining an outer window pane;
means defining an inner window pane;
a generally rectangular frame assembly for securing said inner and outer window panes in spaced relation, said frame assembly comprising an upper and a lower member and two side members;
collapsible shade means secured within said frame assembly, said collapsible shade means with a fixed end and a moving end and extensible between a substantially closed position and a substantially open position;
actuator means operatively connected to said shade means for moving said shade between the opened and the closed position, said actuator having a throw that is less than the distance between the opened and the closed position, but capable of moving the shade between a substantially opened and substantially closed position by moving said actuator means;
wherein said actuator means comprises
a reversing screw and a coupler, said coupler being rifled to match the radius and pitch of said screw and adapted to slide longitudinally along said reversing screw, wherein sliding said coupler in a first direction causes said shade to move towards the open position and when moving said coupler in a second direction causes said shade to move towards the closed position;
said actuator means further comprising
a drive cog wheel located at a first end of said reversing screw and a free cog wheel located adjacent to the upper frame member of said frame assembly and an endless cog belt connecting said drive cog wheel with said free cog wheel, wherein said cog belt is attached to the moving end of said collapsible shade means and rotation of said reversing screw causes said drive cog



wheel to rotate and thereby causes said shade means to move between the open and the closed position;
a mounting means capable of mounting said actuator means to said frame assembly;
a cog belt guide means for maintaining the track of the cog belt between said drive cog wheel and said free cog wheel; and
an alignment maintenance, said alignment maintenance means to maintain the moving end of said collapsible shade means perpendicular with the direction of travel of said collapsible shade means.

4,998,577

DEVICE FOR STABILIZED OPENING AND CLOSING OF A SLIDING PANEL

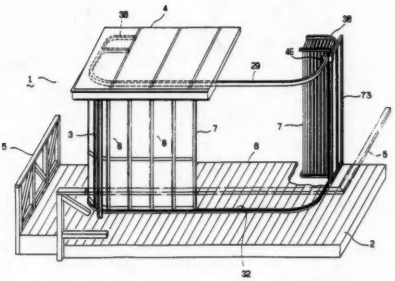
Mitsuru Kobayashi, Komagane, and Hori Keishirou, Ina, both of Japan, assignors to Toyo Exterior Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 31, 1989, Ser. No. 429,362
Claims priority, application Japan, Aug. 31, 1989, 1-225052
Int. Cl.[5] E05D *15/06*
U.S. Cl. 160—202 **5 Claims**

1. In a collapsible sliding panel assembly including a plurality of individual sliding panels movable along at least an upper guide rail between a closed position whereat said panels extend sequentially along said guide rail and an open position whereat said panels are brought into adjacent parallel alignment at a storage location, and means for moving said panels along said guide rail between said open and closed positions, the improvement wherein said moving means comprises:
a plurality of rack-like plates, one said rack-like plate being mounted on an upper portion of a first side of each said panel and extending along substantially the entire horizontal length thereof, each said rack-like plate having vertical teeth extending outwardly from said first side of the respective said panel;
a driving roller mounted on said guide rail at a position

adjacent said storage location, said driving roller having on a periphery thereof vertical teeth, and said driving roller being positioned on said first side of said panels with said teeth of said driving roller engaged with said teeth of said rack-like plate of one of said panels;

a motor mounted in cooperative driving relationship for rotating said driving roller in opposite directions about a vertical axis, and thereby for causing said teeth of said driving roller to successively engage with said teeth of



said rack-like plates of adjacent said panels, thus moving said panels in opposite directions along said guide rail; and

a pinch roller mounted on said guide rail at a position opposed to said driving roller and in contact with a second side of one said panel, thereby to ensure that said teeth of said rack-like plates on said first sides of said panels are maintained in engagement with said teeth of said driving roller during movement of said panels along said guide rail by said driving roller.

4,998,578

METHOD OF MAKING METAL MATRIX COMPOSITES

Ratnesh K. Dwivedi, Wilmington, and Virgil Irick, Jr., Hockessin, both of Del., assignors to Lanxide Technology Company, LP, Newark, Del.

Continuation of Ser. No. 142,385, Jan. 11, 1988, Pat. No. 4,871,008. This application Jul. 17, 1989, Ser. No. 380,977

The portion of the term of this patent subsequent to Oct. 3, 2006, has been disclaimed.

Int. Cl.[5] B22D *19/14*

U.S. Cl. 164—6 **8 Claims**

1. A method of producing a metal matrix composite, comprising:

(a) forming a substantially impervious mold by the steps comprising:

(i) providing a permeable preform having a cavity and comprised of a first filler material comprising a material selected from the group consisting of alumina and silicon carbide;

(ii) contacting a molten parent metal comprising aluminum with said preform and with an oxidant comprising air to react molten parent metal with said oxidant to form an oxidation reaction product within a temperature range extending from a temperature above the melting point of said parent metal to a temperature below the melting point of said oxidation reaction product;

(iii) maintaining at least a portion of said oxidation reaction product in contact with and extending between said molten parent metal and said oxidant to progressively draw molten parent metal through the oxidation reaction product towards the oxidant and into said preform so that the oxidation reaction product continues to form within said preform at the interface between said oxidant and previously formed oxidation reaction product;

(iv) continuing said oxidation reaction within said temperature range to embed at least a portion of said preform within said oxidation reaction product by growth of the oxidation reaction product to thereby provide an impervious mold with said cavity; and

(v) removing at least a portion of excess metal from said cavity which has not reacted with said oxidant to form oxidation reaction product;

(b) emplacing a permeable mass of a second filler material comprising silicon carbide within said cavity of said impervious mold, and

(c) contacting said mass of second filler material with at least one molten metal selected from the group consisting of aluminum and magnesium;

(d) hermetically sealing the mold contents for a period of time sufficient to spontaneously infiltrate said mass of second filler with said at least one molten metal; and

(e) upon completion of step (d), solidifying said at least one molten metal to provide said metal matrix composite.

4,998,579

ELECTRODE CASTING SYSTEM

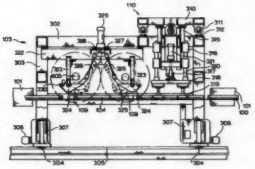
Eric L. Mawer; Martin Vanderminnen; Robert D. H. Willans, all of Fruitvale; Michael Graham, Vancouver, and Robert E. Manwell, Trail, all of Canada, assignors to Cominco Ltd., Vancouver, Canada

Filed May 11, 1989, Ser. No. 350,200

The portion of the term of this patent subsequent to Nov. 13, 2007, has been disclaimed.

Int. Cl.[5] B22D *47/00, 35/00*

U.S. Cl. 164—130 **22 Claims**



1. A system for casting electrodes comprising a stationary casting mold having a centre line, a bottom in the shape of an electrode having a substantially vertical continuous sidewall surrounding said bottom, said sidewall including opposed parallel sidewall portions and having a layer of an insulating elastomeric compound attached to the full length of said continuous sidewall inside the mold whereby flash on the electrode edge is essentially eliminated; means for adding molten metal to said mold, said means for adding including two tip-

ping melt dispensers being positioned above said mold parallel to said centre line and the melt dispensing from said dispensers upon tipping of said dispensers flows substantially parallel to the full length of said opposed sidewall portions towards said centre line such that wave action created in the melt in the mold by the dispensing of melt is substantially dampened and electrodes solidify essentially with even thickness; means for applying cooling to said bottom of the mold; and lifting means to remove said electrode from said mold.

4,998,580

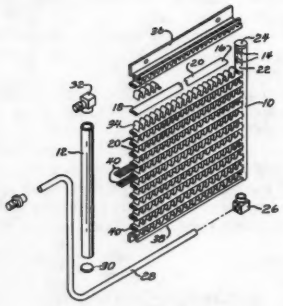
CONDENSER WITH SMALL HYDRAULIC DIAMETER FLOW PATH

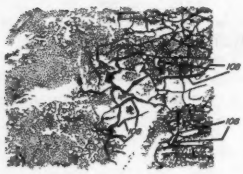
Leon A. Guntly, and Norman F. Costello, both of Racine, Wis., assignors to Modine Manufacturing Company, Racine, Wis.

Continuation-in-part of Ser. No. 902,697, Sep. 5, 1986, abandoned, which is a continuation-in-part of Ser. No. 783,087, Oct. 2, 1985, abandoned. This application Jan. 7, 1988, Ser. No. 141,628

Int. Cl.[5] F28F *13/18, 19/02*

U.S. Cl. 165—133 **10 Claims**





1. A condenser comprising:

a pair of spaced headers arranged to have a vapor inlet and a condensate outlet;

a plurality of tubes extending in hydraulic parallel between said headers, each in fluid communication with each of said headers;

said tubes having a plurality of discrete hydraulically parallel capillary fluid flow paths between said headers;

each of said fluid flow paths being noncircular in cross section and having at least one elongated crevice extending along the length thereof;

the hydraulic diameter of each of said flow paths being sufficiently small that surface tension in condensate in said crevice will create an area of relatively lower pressure thus causing a pressure differential whereby condensate in a film elsewhere in said flow path will flow by operation of said pressure differential to said crevice;

said hydraulic diameter being in the range of about 0.015 to 0.040 inches, said hydraulic diameter being the cross-sectional area of the corresponding flow path multiplied by four and divided by the wetted perimeter of the corresponding flow path; and,

said flow paths having surfaces subjected to vapor and condensate and including microcracks.

4,998,581

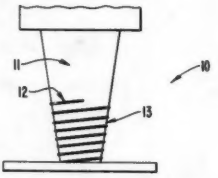
REINFORCED CERAMIC INVESTMENT CASTING SHELL MOLD AND METHOD OF MAKING SUCH MOLD

Jan M. Lane, Hampton; John Corrigan, Tabb, both of Va., and Philip D. Crouch, New Berlin, Wis., assignors to Howmet Corporation, Greenwich, Conn.

Filed Dec. 16, 1988, Ser. No. 285,412

Int. Cl.[5] B22C *9/00*

U.S. Cl. 164—517 **17 Claims**



1. A method of making a ceramic investment casting shell mold, said method comprising the steps of:

providing a pattern having the shape of the desired casting;

dipping said pattern into a ceramic slurry to form a coating on said pattern;

applying a ceramic stucco on said coating;

repeating said dipping step and said applying step to build up said shell mold to an intermediate thickness, said intermediate thickness being less than the desired overall thickness of said shell mold;

disposing a fibrous reinforcing material around said shell mold;

building up said shell mold to the desired overall thickness by repeating said dipping step and said applying step over said reinforcing material; and

firing said shell mold, said fibrous reinforcing material having high tensile strength at elevated temperature such that said reinforcing material remains an integral part of said shell mold after firing and said fibrous reinforcing material having a coefficient of thermal expansion that is less than the coefficient of thermal expansion of the ceramic materials comprising said ceramic slurry and said ceramic stucco.

4,998,582

REFRIGERATOR SYSTEM FOR A CONTAINER

Kanji Fudono; Hiroshi Ogawa; Toshimasa Takahashi, all of Nagoya, and Toshio Yamashita, Nishi-Biwajima, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 21, 1989, Ser. No. 454,505

Claims priority, application Japan, Mar. 6, 1989, 1-24779

Int. Cl.[5] F25B *29/00;* **G05D** *23/00*

U.S. Cl. 165—11.1 **10 Claims**

6. A diagnosing assembly, for use with a refrigerating system for a container, for determining the existence of an abnormal condition of the container, said assembly comprising:

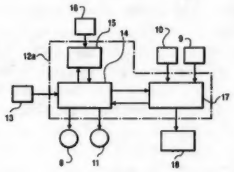
a container inside temperature detector to be located inside a container for detecting the temperature therein;

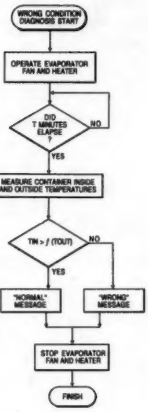
a container outside temperature detector to be located outside the container for detecting the temperature outwardly thereof;

control means, to be operably connected to an evaporator fan and to an electric heater of the refrigerating system, and operable in response to an abnormal condition diagnosis instruction, for operating the evaporator fan and the

electric heater, whereby the temperature inside the container increases; and

abnormal condition diagnostic means, operably connected to said container inside temperature detector and to said container outside temperature detector, for diagnosing





whether or not an abnormal condition of the container is present as a function of the temperatures detected by said container inside temperature detector and said container outside temperature detector after a predetermined period of time of operation of the evaporator fan and the electric heater by said control means.

4,998,583

HEAT TRANSFER EQUIPMENT

Ulrich Lahne, Deisenhofen; Ulrich Hildebrandt, Pullach, and Max Braeutigam, Seeon, all of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

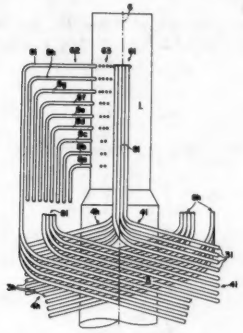
Filed Jul. 28, 1989, Ser. No. 386,078

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1988, 3825724

Int. Cl.[5] B01J *8/02;* **B65D** *88/74;* **F28D** *1/04*

U.S. Cl. 165—163 **22 Claims**

1. In a device for performing chemical or adsorptive processes having a chamber adapted to contain a bed of free-flowing granular material, said chamber containing a plurality of spirally wound cylindrical tube coils which are spaced apart, nested together, and extend concentrically around a symmetry axis of the tube coils, each cylindrical tube coil being formed from a plurality of tube bundles which are spirally wound together in a substantially cylindrical configuration, each of the tube bundles containing a plurality of tubes, at least at one end of the coils the tube bundles which form a tube coil emerge from that coil at different defined spaced points around the circumference of the coil, adjacent tubes in a tube coil being spaced apart and the distance decreases between adjacent tubes in a tube bundle as the tube bundle emerges from a tube coil, said emerging tube bundle extending substantially parallel to said symmetry axis before it is connected to a collector, said emerging tube bundles being grouped closely together,



whereby large areas at the end of the tube coils are left free of tube bundles.

4,998,584

HEAT EXCHANGER

John D. Foglesonger, Los Angeles, and David M. Vranson, Canyon Country, both of Calif., assignors to ITT Corporation, New York, N.Y.

Filed Jun. 7, 1990, Ser. No. 534,768

Int. Cl.[5] F28F *3/12*

U.S. Cl. 165—171 **7 Claims**

1. A method of forming a heat exchanger including the steps of, forming a cavity in at least one side of a body of aluminum alloy for inserting a heat exchange tubing of a dimension less than the cavity, precoating the tubing and cavity by spraying with boron nitride powder in a carrier, placing the heat exchange tubing in the cavity, filling the space between the wall of the cavity and the tubing with boron nitride powder in a solvent such as alcohol and bonding the two sides together.

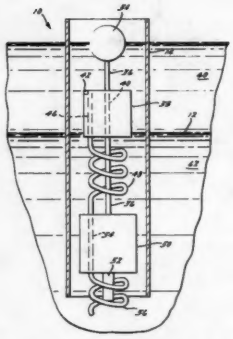
6. A heat exchanger formed from a body of aluminum alloy having two sides, a heat exchange tubing, a groove machined in the body in the shape of said heat exchange tubing but of a dimension larger than said tubing, boron nitride filling the space between the tubing and the body sides which are bonded together whereby corrosion problems are minimized and heat transfer is enhanced.

4,998,585

FLOATING LAYER RECOVERY APPARATUS

Kevin Newcomer, Monroe, and Steve Richter, Ann Arbor, both of Mich., assignors to QED Environmental Systems, Inc., Ann Arbor, Mich.

Filed Nov. 14, 1989, Ser. No. 436,546
Int. Cl.[5] E21B *43/38*; B01D *17/00*
U.S. Cl. 166—105 11 Claims



1. Apparatus for recovery of a layer of a first underground liquid floating on a second underground liquid in a well, said apparatus comprising:

first float means disposed in said well in said first liquid, said float means having an effective buoyancy such that it floats in said first liquid;

second float means disposed in said well in said first liquid, said float means having an effective buoyancy such that it floats near the bottom of said first liquid, said second float means having top, side and bottom surfaces;

an inlet means disposed on said second float surface for permitting entry of said first liquid;

conduit means coupled to said inlet means and extending below said second float means;

third float means disposed in said second liquid and having an effective buoyancy such that said third float means will remain submerged in said second liquid, said conduit means being coupled to said third float; said

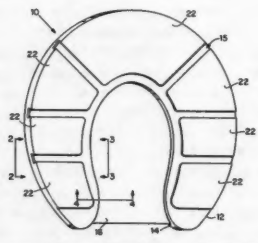
guide means for slidably connecting said second float between said first and third float means.

4,998,586

HOOFED-ANIMAL SHOE PAD

Alfred E. Fox, P.O. Box 231, Newton, Mass. 02166, and James B. Boulton, 16 Kingsview Rd., Marlborough, Mass. 01752

Filed Sep. 22, 1989, Ser. No. 411,409
Int. Cl.[5] A01L *7/02*
U.S. Cl. 168—12 8 Claims



1. A resilient pad to be placed between a foot and a shoe of a hoofed animal, said pad comprising

a first plastic polymer having a first durometer, and characterized by absorbing significant energy from impact-related shock, and

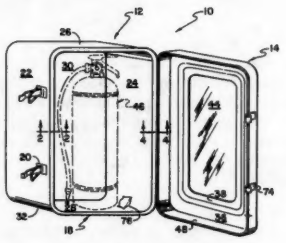
a second plastic polymer having a second durometer higher than said first durometer and characterized by dissipating significant energy from impact-related shock, wherein when said pad is in position between said foot and said shoe, said first plastic polymer is simultaneously in contact with said foot, said second plastic polymer and said shoe, and said second plastic polymer is in contact with said first plastic polymer and free of contact with said foot so that said first plastic polymer is subjected to limited compression and may flow somewhat under the weight of said animal allowing absorbing significant energy from impact-related shock while said second plastic polymer dissipates energy from impact-related shock transmitted by said first polymer to prevent the energy thus dissipated from being reabsorbed by the foot of said animal to help reduce stresses on the bones and ligaments of the foot and leg of said hoofed animal.

4,998,587

FIRE EXTINGUISHER CABINET WITH SEALING MEANS

Loyd Thomas, 5825 Hall, Corpus Christi, Tex. 78409

Continuation-in-part of Ser. No. 229,238, Aug. 8, 1988, abandoned. This application Dec. 15, 1989, Ser. No. 451,044
Int. Cl.[5] A62C *33/00*, *39/00*
U.S. Cl. 169—51 5 Claims



1. A fire extinguisher cabinet comprising

a compartment having first and second side walls, top and bottom walls transverse to the side walls and a back wall, the top, bottom and side walls providing therebetween curved corners and providing edges lying in a common plane;

a front wall comprising a front panel sized to receive the edges and a peripheral skirt extending around and away from the front panel;

means sealably mounting the front wall on the compartment for preventing air entry into the compartment, including

a gasket having a groove receiving the edges throughout the length thereof and an exposed curvilinear sealing surface for abutting and sealing against the front panel in a closed path comprising an extension of the edges and for abutting and sealing against the skirt throughout the periphery thereof;

means pivotably mounting the front wall on the compartment for movement between a first open position and a second closed position in which the gasket seals against the front panel and against the skirt; and

means for latching the front wall in the second position; and

a fire extinguisher in the compartment.

4,998,588

HAND TOOL WITH A SHIFTING GEAR UNIT

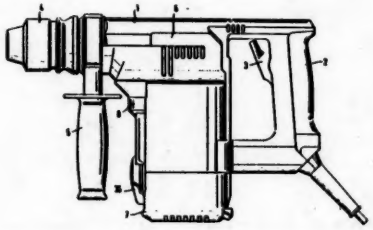
Erwin Manschitz, Puchheim, Fed. Rep. of Germany, assignor to Hilti Aktiengesellschaft

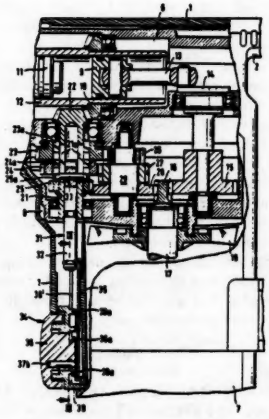
Filed Dec. 8, 1989, Ser. No. 448,018

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1988, 3841515

Int. Cl.[5] B25D *11/00*

U.S. Cl. 173—47 5 Claims





1. Hand tool, including a gear box containing a plurality of gears, (**23, 24, 25**) positioned on an output drive shaft (**21**), a switching device for selectively coupling said gears to said output drive shaft for selectively fixing one of said gear wheels to said output shaft for rotating said shaft, a slide (**35**) having a displacement direction and being displaceable relative to said output drive shaft for selecting the engagement of said gears with said shaft, a handle rotatably mounted about an axis extending transversely of the displacement direction with the axis extending through a plane containing said slide and engageable with said slide for displacing said slide, said slide includes engagement recesses (**38***a*, **38***b*) in a surface facing said handle, said engagement recesses being spaced rectilinearly apart in the displacement direction, said handle includes drive cams (**37***a*, **37***b*) spaced equidistantly radially from said handle axis, said drive cams spaced angularly apart about said handle axis, said engagement recesses being spaced apart a distance (**T**) corresponding to the angular spacing (**1**) of said drive cams, and said drive cams being engageable within said engagement recesses by rotating said handle about the axis thereof through an angle of less than 180°.

4,998,589

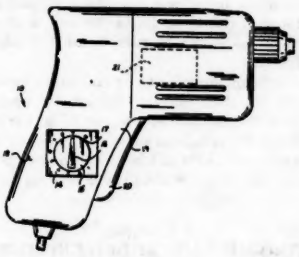
VARIABLE SPEED DRILL CONTROL CAM APPARATUS

John A. Wiesendanger, 7331 Rustic Woods Dr., Dayton, Ohio 45424

Filed Feb. 26, 1990, Ser. No. 484,998

Int. Cl.[5] H01H *9/06*

U.S. Cl. 173—170 5 Claims



1. A variable speed drill control cam apparatus in combination with a variable speed drill including a variable speed motor and an elongate housing,

the elongate housing includes a handle member, and

the handle member including a right side wall, and

the handle member further including a trigger member reciprocatably mounted interiorly of the handle member, the trigger including a forward edge positioned exteriorly of the handle member, and

a rear edge mounted interiorly of the handle member, the apparatus further including,

a cam means rotatably mounted within the handle member, with the cam means positioned for providing selective abutment of the rear edge of the trigger.

4,998,590

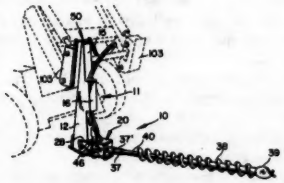
HORIZONTAL AUGER FOR SKIDSTEER TRACTORS AND THE LIKE

Allen Wells, 5956 Maleville Ave., Carmichael, Calif. 95608, assignor to Allen Wells and David Hansen, both of Sacramento, Calif., a part interest

Filed May 15, 1989, Ser. No. 352,416

Int. Cl.[5] E21B *7/02*

U.S. Cl. 175—162 10 Claims



1. An auger device for mounting on a tractor, preferably of the skidsteer type, for drilling generally horizontal holes, which device comprises:

a. an elongated main housing having a pair of spaced sidewalls, having means attached to said sidewalls for receiving the accessory shoe of a tractor for physical attachment thereto,

b. a motor housing having a front wall and a top wall, pivotally mounted to said main housing at the bottom end of said, main housing and which motor housing has a motor connected to a pair of hydraulic couplers mounted within said motor housing; said hydraulic couplers being accessible for connection to hydraulic lines leading from said tractor, and means for coupling an auger bit to said motor

coupled to said hydraulic couplers and extending generally horizontally,

wherein the means for coupling an auger bit to said motor comprises: a bearing mounted to the front wall of said motor housing and connectable thereto from said front wall and a power coupler adapted to receive the shaft of an auger bit, coupled to said bearing, and wherein the main housing includes a pair of spaced side walls and is open in part on the underside thereof, and wherein the pivotal mounting of said motor housing to said main housing comprises:

at least one upstanding flange on said motor housing extending into the main housing through the opening on the underside thereof, said at least one flange having an opening therein for receipt of a pin, and said at least one flange being retained within said main housing by a pin extending through the side walls of said main housing and said bores.

4,998,591

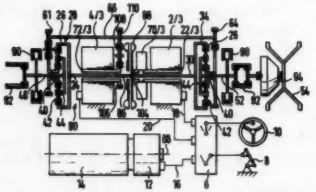
ELECTRO-MECHANICAL DRIVE SYSTEM FOR A FULL-TRACK VEHICLE

Franz-Xaver Zaunberger, Augsburg, Fed. Rep. of Germany, assignor to Renk Aktiengesellschaft, Augsburg, Fed. Rep. of Germany

Continuation of Ser. No. 412,612, Sep. 26, 1989, abandoned, Division of Ser. No. 234,204, Aug. 18, 1988, abandoned. This application Dec. 7, 1989, Ser. No. 447,375

Int. Cl.[5] B62D *11/10*

U.S. Cl. 180—6.44 **11 Claims**



1. An electro-mechanical drive system for a full-track vehicle, comprising:

an electric drive motor for driving track-driving wheels of the vehicle;

at least one steering control unit in the form of an electric motor for controlling the track-driving wheels so as to steer the vehicle, wherein the drive motor and the steering control motor are supplied with electric energy from an electric generator which is driven by an internal combustion engine;

a differential gear arrangement including two differential gear sets connected to the track-driving wheels of the vehicle;

a drive control connection between the drive motor and the differential gear arrangement;

a steering control connection between the steering control motor and a steering control element of the differential gear arrangement;

wherein the drive control connection comprises first and second portions of a drive shaft disposed between the differential gears, and the drive motor is disposed coaxially about and in driving engagement with the first drive shaft portion, and the steering control motor is disposed coaxially about the second drive shaft portion;

and two control outputs of the differential gear arrangement disposed coaxially with the first and second drive shaft portions for driving the track-driving wheels, whereby both the drive motor and the steering control motor are disposed between differential gear sets, and said first and second drive shaft portions are coaxial with respect to the axis of rotation of the track-driving wheels.

4,998,592

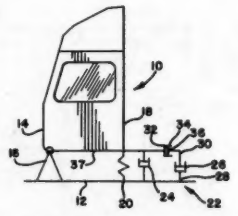
PASSIVE MECHANICAL DAMPING SYSTEM FOR A TRUCK

Edward E. Londt, Fort Wayne, and Duane S. Robinson, New Haven, both of Ind., assignors to Navistar International Transportation Corp., Chicago, Ill.

Filed Jun. 12, 1990, Ser. No. 536,818

Int. Cl.[5] B62D *33/10*

U.S. Cl. 180—89.12 **10 Claims**



1. A passive mechanical damping system for use in a suspension of a component of a truck relative to a frame thereof, said truck having a primary suspension spring disposed between said truck frame and said component, comprising:

a primary damper continuously engaged between said truck frame and said component, said primary damper generating a low resistive force in response to telescoping movement thereof; and

a secondary damper mounted between said truck frame and said component, said secondary damper generating a high resistive force in response to telescoping movement thereof, one end of said secondary damper being engaged within a lost motion connection disposed between said frame and said component, said secondary damper becoming active to resist relative movement between said component and said frame upon said component being displaced an amount relative to said frame sufficient to take up said lost motion connection;

said damping system providing minimal damping at low levels of component movement and high damping during excursions of said component beyond preset limits defined by said lost motion connection.

4,998,593

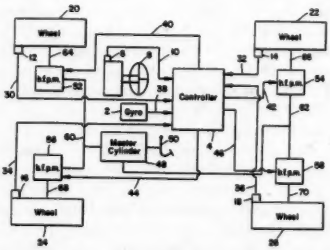
STEERING AND BRAKE CONTROLLING SYSTEM

Dean C. Karnopp, and Yoshiyuki Yasui, both of Davis, Calif., assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Mar. 31, 1989, Ser. No. 331,343

Int. Cl.[5] B62D *5/00, 6/00*

U.S. Cl. 180—140 **21 Claims**



1. A method for controlling steering and braking of a vehicle in motion having brakes and a steering mechanism, and further having an actual yaw rate defined as the sideward velocity of the vehicle and a lateral acceleration defined as the sideward acceleration of the vehicle, and with respect to which one of a

desired yaw rate, defined as the desired sideward velocity of the vehicle according to a control algorithm, and a desired lateral acceleration, defined as the desired lateral acceleration of the vehicle according to a control algorithm, is ascertained, comprising the steps of:

measuring one of said actual yaw rate and said actual lateral acceleration;

deriving a corresponding one of said desired yaw rate and said desired lateral acceleration according to said control algorithm;

determining the corresponding one of a yaw rate error, defined as the difference between said actual yaw rate and said desired yaw rate, and a lateral acceleration error, defined as the difference between said actual lateral acceleration and said desired lateral acceleration; and

controlling steering and braking of said vehicle to reduce said one of said yaw rate error and said lateral acceleration error, whereby braking distance is reduced below a braking distance obtained using braking control alone to reduce said one of said yaw rate error and said lateral acceleration error.

4,998,594

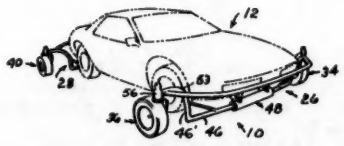
VEHICLE CONTROL TRAINING DEVICE

John C. Orloski, 6613 SE. Penny La., Bartlesville, Okla. 74006

Filed Dec. 4, 1989, Ser. No. 445,208

Int. Cl.[5] B60P *3/06*

U.S. Cl. 180—198 **6 Claims**



1. An apparatus for reducing the normal coefficient of gripping friction between the tires of a vehicle and the surface of a roadbed, comprising:

generally horizontal rectangular auxiliary frame means for underlying a vehicle frame normally supported by tire equipped wheels,

said auxiliary frame means including elongated side members transversely interconnected by end and intermediate cross braces,

a coextensive first sleeve journaled by the respective end cross brace and connected with said outrigger means, and,

fluid pressure operated means supported by said auxiliary frame and connected with said first sleeve for angular rotation of the latter and raising and lowering said outrigger means;

outrigger means including pairs of caster wheels disposed laterally of respective ends of said auxiliary frame means for horizontal pivoting movement about upright axes; and,

manually operated control means for selectively raising and lowering said pairs of caster wheels by pairs or in unison relative to a vehicle frame and simultaneously tilting the caster wheel pivot axes by pairs relative to their normally vertical axis.

4,998,595

STRUCTURE OF LATERAL DRIVING DEVICE FOR CAR

Pin Yen Yeh, Taipei, Taiwan, assignor to Cheng Chen Lin, Hsien, Taiwan

Filed Mar. 14, 1989, Ser. No. 323,371

Int. Cl.[5] B60S *9/215*

U.S. Cl. 180—202 **8 Claims**

1. A device for effecting lateral movement of a motor vehicle, comprising:

an elongate frame for connection to a vehicle chassis, in parallel relationship with the rotation axes of the vehicle wheels, between the front/rear bumper and the front/rear wheels of the vehicle, respectively;

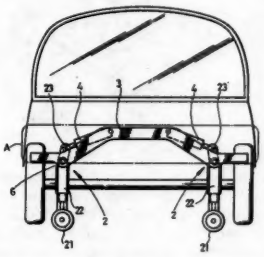
a lateral driving wheel assembly connected, by means of a pivotal connection, to the frame at each of its two opposite ends and capable of movement, relative to the frame, between an extended position for lifting a vehicle from the ground, and a retracted position, in which the vehicle is not lifted from the ground;

each lateral driving wheel assembly comprising a reciprocable hydraulic piston-and-cylinder assembly, the one end of which is pivotally connected to the frame by said pivotal connection and a wheel for lateral movement of the vehicle rotatably mounted at the other end of the hydraulic piston-and-cylinder assembly for rotation about an axis extending transversely of the frame;

hydraulic means for moving the lateral driving wheel assemblies between the extended and the retracted positions;

a hydraulic motor for driving each said wheel for lateral movement of the vehicle;

a hydraulic pump for driving the hydraulic means for moving the lateral driving wheel assemblies between the extended and the retracted positions and the hydraulic piston-and-cylinder assemblies, as well as the hydraulic motor for driving each said wheel for lateral movement of the vehicle;



means for operatively connecting the hydraulic pump to the drive shaft of a vehicle engine;

a hydraulic controller for controlling the operation of the hydraulic means for moving the lateral driving wheel assemblies between the extended and the retracted positions, the hydraulic piston-and-cylinder assemblies and the hydraulic motor driving each said wheel for lateral movement of the vehicle;

a remote control device for installation in the driver's cabin of a vehicle and capable of emitting a remote control signal; and

a remote control signal receiver for receiving signals from the remote control device and operatively connected to the means for operatively connecting the hydraulic pump to the drive shaft of the vehicle engine to activate said latter means.

4,998,596

SELF-PROPELLED BALANCING THREE-WHEELED VEHICLE

Frank J. Miksitz, Phillipsburg, N.J., assignor to UFI, Inc., Phillipsburg, N.J.

Filed May 3, 1989, Ser. No. 346,907

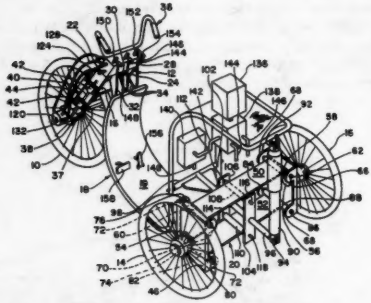
Int. Cl.[5] B60G *5/02;* **B60K** *17/00*

U.S. Cl. 180—213 **5 Claims**

1. A self-propelled three-wheeled vehicle comprising:

a front frame assembly carrying a single ground-engaging front wheel; a rear frame assembly; means pivotally connecting the front and rear frame assemblies to each other for relative swinging movement and said front wheel being fixed to swing with said front frame assembly so as to permit steering of the vehicle with said front wheel; two transversely-spaced-apart, ground-engaging rear

wheels; a transversely extending parallelogram-type balancing linkage having opposite ends to which said rear wheels are rotatably mounted, said linkage being pivotally attached to said rear frame assembly and so constructed as to allow said frame assemblies and a rider on said rear frame assembly to lean into turns during forward movement of the vehicle and also to remain upright when the vehicle traverses or is parked on laterally inclined terrain; a power plant assembly carried on said rear frame assembly, said power plant assembly including an internal combustion engine drivingly connected to a hydraulic pump; a hydraulic motor fixed to said front frame assembly and having a shaft coaxial with and drivingly connected to



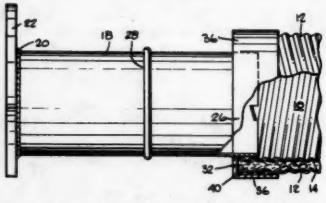
said front wheel; a hydraulic fluid distribution terminal fixed to said front frame assembly so as to swing with the latter during steering of the vehicle; a first set of hydraulic lines for transmitting hydraulic fluid, each line having a first end connected to said pump and a second end connected to said distribution terminal via a universally swivelling fitting located at said terminal; and a second set of hydraulic lines for transmitting hydraulic fluid, each line having a first end connected to said motor and a second end connected to said distribution terminal and connected via an internal passage in said terminal with the second end of a single corresponding hydraulic line of said first set.

4,998,597

INSULATED EXHAUST PIPE ATTACHMENT MEANS

David W. Bainbridge, and William H. Olbert, both of Littleton, Colo., assignors to Manville Corporation, Denver, Colo.

Filed Jul. 31, 1989, Ser. No. 386,841
Int. Cl.[5] F01N *7/18*
U.S. Cl. 181—243 **10 Claims**



1. In the exhaust system of a vehicle powered by an internal combustion engine, wherein the exhaust system includes an insulated pipe comprising an inner corrugated metallic tube and an outer metallic tube, the outer metallic tube being spaced from and concentrically arranged with respect to the inner metallic tube, and refractory fiber insulation filling the space between the inner and outer tubes, the improvement comprising:

a conduit having two ends, one end of which is attached to an element in the exhaust system and the other end of which extends into the inner metallic tube of the insulated pipe at one end of the insulated pipe;

means on the conduit extending transversely therefrom and engaging at least one corrugation of the inner metallic tube to assist in holding the insulated pipe in place on the conduit;

corrugations of the inner corrugated tube being at a known angle to a length of the tube, and the transversely extending means being aligned at an angle to the conduit corresponding to said known angle, whereby the engagement of the transversely extending means with the corrugations permits the conduit to be threaded into the insulated pipe;

a cap having a sleeve portion concentrically arranged with and spaced from the conduit and an end portion connected to the sleeve portion, the end portion being slidably mounted on the conduit, said one end of the insulated pipe extending into the space between the conduit and the sleeve portion of the cap and abutting the end portion of the cap; and

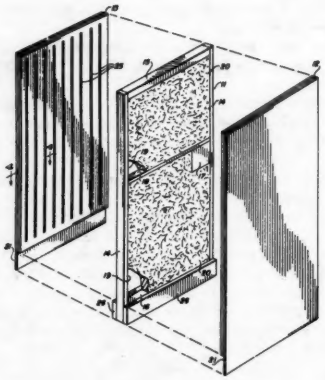
the conduit further including a stop extending transversely therefrom, whereby threading of the conduit into the insulated pipe causes relative movement between the insulated pipe and the conduit, the insulated pipe causing the cap to slidably move on the conduit until the end portion of the cap engages the stop.

4,998,598

ACOUSTICAL DOOR

James K. W. Mardian, Scottsdale, Ariz., and Curtis I. Holmer, Reston, Va., assignors to The Ceco Corporation, Oakbrook Terrace, Ill.

Filed May 30, 1989, Ser. No. 357,801
Int. Cl.[5] E04B *1/82*
U.S. Cl. 181—284 **7 Claims**



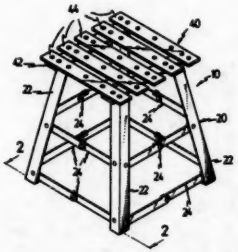
1. An acoustical door comprising first and second panels having inner and outer surfaces, a frame position between and connecting edge regions of the inner surfaces of said first and second panels to provide and enclose a space between the said panels, each of said panels comprising at least three layers of material bonded in close face-to-face relationship and in which a first layer disposed at the outer surface of each panel is less dense than the second and third layers of each panel and the space between the two panels is substantially completely filled with a fibrous sound-absorbing material.

4,998,599

FOLDABLE LADDER

Tzann D. Wang, No. 409, Sec. 1, Lin Sen Rd., 18 Lin, Tung Ren Li, Hu Wei Chen, Yun Lin Hsien, Taiwan

Filed Jun. 18, 1990, Ser. No. 539,202
Int. Cl.[5] E06C 1/383
U.S. Cl. 182—160 5 Claims



1. In a foldable ladder comprising a head step assembly, and a support frame means capable of being in an open position for supporting said head step assembly and being in a folded position for storing said head step assembly, wherein the improvements comprise:

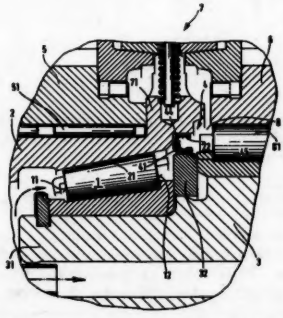
said head step assembly comprising a pair of base plates spaced parallel to each other and a plurality of step plates each having holes thereon; said pair of base plates each having two first protuberances at a bottom side thereof for detachably fixing to said support frame means in its open position, and having a plurality of second protuberances corresponding in number to said step plates on a top side thereof, said second protuberances receiving said holes of said step plate so that said step plates cross over said base plates with one spaced parallel to another when said support frame means is in the open position; said step plates being stackable against both a top and bottom side of said base plate, said stacked base and step plates being storable within said support frame means in its folded positon.

4,998,600

OIL LUBRICATION SYSTEM FOR THE BEARING OF A SHAFT JOURNAL

Gerd Führer, Friedrichshafen, and Karl-Fritz Heinzelmann, Meckenbeuren, both of Fed. Rep. of Germany, assignors to Zahnradfabrik Friedrichshafen AG, Fed. Rep. of Germany

Filed Mar. 3, 1989, Ser. No. 318,897
Claims priority, application Fed. Rep. of Germany, Mar. 9, 1988, 3807708
Int. Cl.[5] F01M 9/00; F16J 15/54
U.S. Cl. 184—6.1 8 Claims



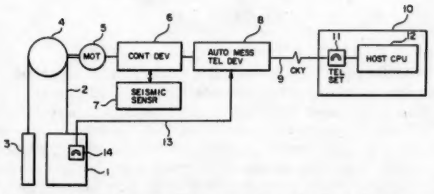
1. An oil lubrication system for a pivot bearing (1) of a transmission, a rotating input shaft (2) positioned around said bearing and situated opposite a coaxial main shaft (3), with lubricating oil being fed on one side (11) of said pivot bearing (1) and being drained radially outwardly on the other side (12) via an annular drainage channel (8) located between both said shafts, wherein an elastic rubber seal (4, 40, 400) is situated in said drainage channel (8, 80) between said two shafts and is attached to one of said two shafts, said elastic rubber seal engages a surface of the other of said two shafts and closes said drainage channel (8, 80) when the one of said two shafts (2) is inactive and disengages from the surface of the other of said two shafts to maintain said drainage channel (8, 80) freely open during operation as the one of said two shafts (2) rotates.

4,998,601

METHOD OF AND APPARATUS FOR CONTROLLED OPERATION OF AN ELEVATOR SYSTEM AT THE OCCURRENCE OF AN EARTHQUAKE

Shigehiko Suzuki, Inazawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jun. 13, 1989, Ser. No. 365,526
Claims priority, application Japan, Jul. 8, 1988, 63-170385
Int. Cl.[5] B66B 13/24
U.S. Cl. 187—107 13 Claims



1. A method of controlling operation of a first elevator at a location within a predetermined geographic region at the occurrence of an earthquake, the geographic region also having a plurality of other elevators at different locations, said method comprising:

the step of providing estimation data items for estimating seismic intensity from different sources including sensors at a plurality of elevator locations within the predetermined geographic region;

the step of transferring said estimation data items to an administration section and collecting said estimation data items in the administration section;

the step of dividing the predetermined geographic region into zones of different seismic intensity on the basis of said estimation data items from the different sources;

the step of providing an assumed seismic intensity in the vicinity of the first elevator based upon its location within the different zones; and

the step of controlling the first elevator on the basis of the assumed seismic intensity.

4,998,602

DRUM BRAKE SHOE HOLD-DOWN AND RETRACTION SPRING AND ANCHOR POST THEREFOR

Mayjue A. Yamamoto, Livonia, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 25, 1989, Ser. No. 412,302
Int. Cl.[5] F16D 65/09, 71/00
U.S. Cl. 188—328 2 Claims

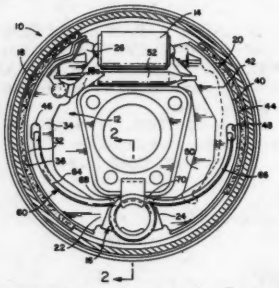
1. A drum brake assembly comprising:

a backing plate having mounted thereon a wheel cylinder and an anchor circumferentially opposite said wheel cylinder, a pair of brake shoe assemblies having a first set of adjacent ends engaging said anchor and a second set of adjacent ends engaging said wheel cylinder for actuation, each of said brake shoe assemblies including a shoe web

having a slot formed therein and located at least as near said wheel cylinder as said anchor, and a single generally U-shaped spring combining the functions of shoe hold-down and shoe retraction springs;

said single spring having a center loop section and first and second spring arms extending from said center loop section, said center loop section being defined by a plurality of torsional spring loops connecting with said first and second spring arms, said spring arms curving toward said backing plate;

said anchor having a spring mounting and retaining post formed of tab-like portions extending substantially perpendicularly away from said backing plate and receiving



said torsional spring loops thereabout in mounting relation and providing spring reaction for shoe hold-down;

said spring arms extending in curvilinear relation from said torsional loops in generally arcuate opposed directions and having outer arm portions in spring-engaging relation with said shoe webs, said spring arms further having hooked ends received in said shoe web slots in spring loaded relation, said spring being torsionally loaded in directions substantially parallel to said backing plate to urge said brake shoe assemblies toward the retracted position and cantilever spring loaded toward said backing plate to urge said brake shoe assemblies in resilient hold-down position against said backing plate.

4,998,603

GARMENT BAG WITH WHEELS AND A DETACHABLE VALET CASE

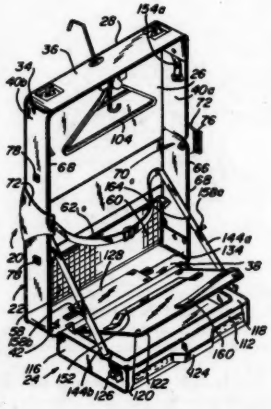
Mark B. Nordstrom, Evergreen, Colo., assignor to Samsonite Corporation, Denver, Colo.

Filed Feb. 23, 1989, Ser. No. 315,328
Int. Cl.[5] A45C *5/14, 5/12, 13/10*
U.S. Cl. 190—18 A **4 Claims**

1. An article of luggage comprising in combination:

a garment bag including a flexible elongated main panel which is foldable along a line transverse to its length between an open condition and a folded transport condition, a pair of side walls, a top wall and a bottom wall connected to said panel, said side walls, top wall and bottom walls having continuous free edges displaced from said main panel and fastener means extending along said free edges to releasably secure the free edge of the top wall to the free edge of the bottom wall and a lower half of each side wall free edge to an upper half of the associated side wall free edge when the main panel is in the folded condition to define an enclosed space,

a valet case and means for releasably attaching the valet case to the bottom wall of said garment bag in a manner such that it is positionable within said enclosed space when the garment bag is in the folded condition, said means for releasably attaching the valet case includes an extendable flap on the valet case for pivotally connecting the valet case to the garment bag whereby the valet case is pivotal from the bottom wall relative to the garment bag between a stored position and a deployed position, and wherein the valet case extends below the bottom wall when the garment bag is in the open condition and is removed from the confines of said main panel, side walls, top wall, and bottom wall of the garment bag when in the deployed position, and



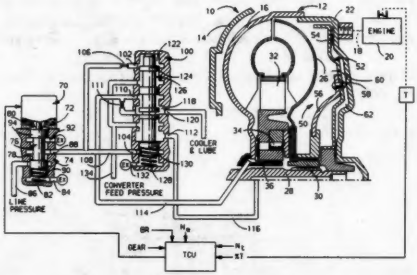
wheel means operatively secured to the garment bag to allow the garment bag to be rolled along a supporting surface when in the folded condition.

4,998,604

VARIABLE CAPACITY CONTROL APPARATUS FOR AN AUTOMOTIVE TORQUE CONVERTER CLUTCH

William J. Vukovich, and Tsunlock A. Yu, both of Ypsilanti, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 12, 1990, Ser. No. 478,860
Int. Cl.[5] F16H *45/02, 61/14*
U.S. Cl. 192—3.3 **3 Claims**



1. Control apparatus for a torque converter clutch engageable to develop torque capacity in relation to the net fluid pressure directed to apply and release chambers thereof, comprising:

means including a control valve for developing a variable magnitude control pressure;

two-state directional valve means including a spool element displaceable to a first position for disabling engagement of said clutch by directing a regulated fluid pressure to said release chamber while exhausting fluid from said apply chamber, and a second position for enabling engagement of said clutch by directing said regulated fluid pressure to said apply chamber while connecting said release chamber

to said control pressure so as to develop clutch torque capacity in relation to the pressure difference; and

means for biasing said spool element to said second position to enable engagement of said clutch when said control pressure exceeds a reference pressure.

4,998,605

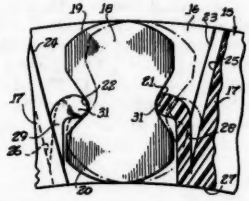
PLASTIC CAGE FOR A ONE-WAY CLUTCH

Ernest A. Ferris, 146 Greenleaf Dr., Oak Brook, Ill. 60521

Filed Feb. 12, 1990, Ser. No. 478,441

Int. Cl.[5] F16D *41/07*

U.S. Cl. 192—41 A **20 Claims**



1. In a one-way clutch assembly comprising an inner race having an exterior cylindrical surface, an outer race having an interior cylindrical surface, and an overrunning clutch with a plurality of sprags acting to contact said interior and exterior surfaces to engage the clutch, the improvement comprising a one-piece plastic cage having an inner diameter and an outer diameter concentrically positioned between the inner and outer races and having a plurality of circumferentially spaced openings therethrough receiving the sprags, each opening having diverging walls, and a pair of spring fingers within each opening integral with the cage and extending generally radially to engage a sprag.

4,998,606

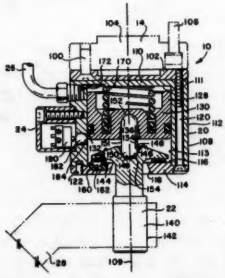
PROGRAMMABLE BREAKAWAY CLUTCH SYSTEM WITH COLLAPSIBLE FAILURE MODE

Peter E. McCormick, Dallas, and Walter D. Autry, Jr., Keene, both of Tex., assignors to EOA Systems, Inc., Dallas, Tex.

Filed Jan. 31, 1990, Ser. No. 474,486

Int. Cl.[5] F16D *43/20*

U.S. Cl. 192—56 F **4 Claims**



1. A breakaway clutch for robot end-of-arm tooling, comprising:

a housing having a cavity, said cavity being defined by a forward cavity wall, a rear cavity wall and a side cavity wall, with said side cavity wall being cylindrical about a central axis;

a movable member confined within the cavity, said movable member capable of linear movement along said central axis from a normal position within said cavity spaced apart from said rear cavity wall to a position spaced more closely to said rear cavity wall, said movable member including an inwardly-tapering frustroconical internal side wall joined to a semi-spherical internal end wall, and said internal side and end walls being coaxial with said central axis and open in the direction of said front cavity wall;

a tool connecting member having an external end adapted for connecting the clutch to a tool, said tool connecting member having an internal end within said cavity, said internal end having an inwardly-tapering frustroconical internal side wall joined to a semi-spherical internal end wall, and said internal side and end walls being coaxial with said central axis when said movable member is in said normal position and open in the direction of said rear cavity wall;

a link spanning between said tool connecting member and said movable member, said link having semi-spherical external end walls engaged with said internal end walls of said movable and tool connecting members, such that said movable member and tool connecting member are spaced apart and forces upon said tool connecting member are applied to said movable member;

means for locating said tool connecting member such that when said movable member is in said normal position said tool connecting member is located with respect to said front cavity wall and movable in all directions except in the direction of said front cavity wall;

biasing means for biasing said movable member toward said normal position established by said means for locating, said biasing means being adjustable to vary the bias and thereby vary the sensitivity of said clutch to forces applied to said movable member by way of said tool connecting member; and

sensing means for sensing movement of said movable member away from said normal position.

4,998,607

FLUID COUPLING HAVING DAMPED BIMETALLIC SPRING

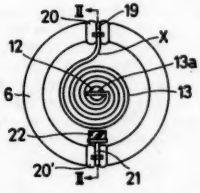
Kenichiro Mizutani; Seiya Tanaka, both of Kariya, and Atsushi Ohmi, Anjo, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jan. 10, 1990, Ser. No. 463,292

Claims priority, application Japan, Jan. 20, 1989, 01-004394[U]

Int. Cl.[5] F16D *35/00, 43/25*

U.S. Cl. 192—58 B **5 Claims**



1. A fluid coupling comprising:

a casing supported by a drive shaft;

a cover fixed to said casing to form a chamber;

a partition plate having a passage and dividing said chamber into a fluid reservoir and an operation chamber;

a rotor disposed in said operation chamber;

a valve plate operable to selectively open and close said passage in said partition plate;

a stud supported by said cover and fixed to said valve plate such that rotation of said stud operates said valve plate; and

a bimetal spring having an inner end fixed to said stud and an outer end fixed to said cover for rotating said stud in response to temperature changes; and

damping means disposed between said cover and said bimetal spring, said damping means comprising a rubber element mounted on a bracket fixed to a part of said cover, said rubber element being positioned sufficiently close to said bimetal spring that said rubber element engages said bimetal spring at least during vibration of said bimetal spring, wherein said bracket does not overlie said damping means at an axial side of said damping means with respect to the axis of rotation of said rotor, whereby a contact between said damping means and said bimetal spring is visible.

4,998,608

CLUTCH DISK WITH DELAYED FRICTION DEVICE

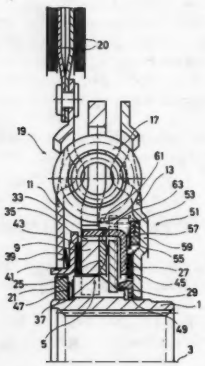
Harald Raab, Schweinfurt; Norbert Ament, Werneck, and Dieter Bernhard, Schwebheim, all of Fed. Rep. of Germany, assignors to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

Filed Jul. 9, 1990, Ser. No. 549,905

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1989, 3922730

Int. Cl.[5] F16D *3/66*

U.S. Cl. 192—106.2 **10 Claims**



1. A clutch disk for a motor-vehicle friction clutch, comprising:

(a) a hub (1) which defines an axis (3) of rotation,

(b) a first spring device (19) dimensioned for the load operation, which first spring device (19) has a first hub disk (9) connected via a tooth system (5) to the hub (1) in such a way as to be fixed in terms of rotation but with limited rotary play (7), two first lateral disks (11, 13) arranged axially on either side of the first hub disk (9), firmly connected to one another but rotatable relative to the hub (1) and to the first hub disk (9) about the axis (3) of rotation, and a plurality of first springs (17) coupling the first lateral disks (11, 13) to the first hub disk (9) in a torsionally elastic manner,

(c) a spring device (23) arranged axially between the first hub disk (9) and one (13) of the two first lateral disks and radially in the space between the hub (1) and the first springs (17) and dimensioned for the idling operation, which spring device (23) has a second hub disk (29) firmly connected to the hub (1), two second lateral disks (25, 27) arranged axially on either side of the second hub disk (29), coupled to one another and to the first hub disk (9) in such a way as to be fixed in terms of rotation and rotatable together with the latter relative to the second hub disk (29), and at least one second spring (31) coupling the second lateral disks (25, 27) to the second hub disk (29) in a torsionally elastic manner,

(d) a first friction device (39, 43, 45) dimensioned for the load operation, which first friction device (39, 43, 45) has a first friction ring (45) arranged axially between the first lateral disk (13), axially adjacent to the second spring device (23), and the second lateral disk (27), axially adjacent to this first lateral disk (13), and frictionally coupling this lateral-disk pair (13, 27), and a first preloading spring (39) arranged on the side of the first hub disk (9) axially remote from the second spring device (23) and producing an axial supporting force for the first friction ring (45),

(e) a second friction device (51) which comes into effect in a delayed manner during relative rotation between the hub (1) and the first lateral disks (11, 13), is arranged radially in the space between the first friction ring (45) and the first springs (17) and overlaps radially with the second lateral disk (27) of the lateral-disk pair (13, 27), which second friction device (51) has a control disk (53) arranged axially between the lateral disks of the lateral-disk pair (13, 27) frictionally coupled by the first friction ring (45), rotatable relative to the lateral-disk pair (13, 27) and the second hub disk (29) about the axis (3) of rotation and in friction contact with one of the lateral disks (13) of the lateral-disk pair. (13, 27), from the outer peripheral area of which control disk (53) lobes (61) project axially which, with play in the relative direction of rotation, engage into windows (63) of the second hub disk (29), and at least one second preloading spring (57) arranged axially between the control disk (53) and the other respective lateral disk (27) of the lateral-disk pair (13, 27) and producing an axial supporting force, and

(f) clutch friction linings (20) mounted on one (11) of the first lateral disks (11, 13).

4,998,609

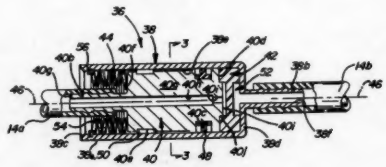
DAMPER FOR HYDRAULIC CLUTCH ACTUATOR

Richard A. Nix, Auburn Hills; Leslie P. Branum, Sterling Heights; Mark W. Rei, Sterling Heights, and Michael L. Schwartz, Troy, all of Mich., assignors to Automotive Products plc, Warwickshire, England

Filed Jan. 16, 1990, Ser. No. 466,051

Int. Cl.[5] F16D *25/12, 25/08*

U.S. Cl. 192—109 F **23 Claims**



13. A hydraulic clutch actuator comprising:

(A) a master cylinder having a discharge port;

(B) a slave cylinder having an inlet port; and

(C) a conduit extending between said master cylinder discharge port and said slave cylinder inlet port and defining a central longitudinal conduit axis;

(D) a damper in said conduit and including a housing defining a bore having a central longitudinal axis extending parallel to the central longitudinal axis of said conduit and a spring biased piston mounted for reciprocal movement in said bore in continuous sealing engagement with said bore;

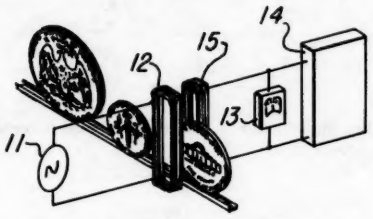
(E) said piston being annular and defining a central passage extending axially therethrough coaxial with the central longitudinal axis of said conduit.

4,998,610

COIN DETECTOR AND COUNTER

Adil S. Said, 4341 Southern, Dallas, Tex. 75205, and Leo J. Higdon, 4214 U.S. Hwy. 80, Apt. 2045, Mesquite, Tex. 75149

Filed Sep. 19, 1988, Ser. No. 245,519
Int. Cl.[5] G07D *5/08*
U.S. Cl. 194—318 **11 Claims**



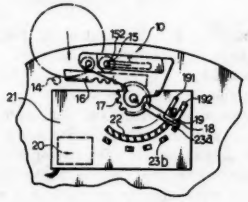
6. A fare box for a mass transit vehicle comprising means for guiding coins placed therein, means for generating an electromagnetic field in the path of said coins, and an elongated coreless coil for detecting voltage changes in said field caused by each coin as it passes through said field, in order to identify each coin, the length of said coil being perpendicular to the path of said coins, and the width thereof being no greater than the diameter of the smallest coin to be passed.

4,998,611

COIN DISTINGUISHING MECHANISM FOR A COIN KEEPER

William Shuie, P.O. Box 10780, Taipei, Taiwan

Filed Sep. 25, 1989, Ser. No. 412,185
Int. Cl.[5] A45C *1/12*
U.S. Cl. 194—337 **2 Claims**



1. A coin distinguishing apparatus for discriminating coins of various diameters, comprising:

a. a container having a coin slot means in the surface for coins to be inserted, said slot means having a passageway defined by two generally flat, opposite walls spaced by a distance greater than the width of a coin, and two elements, wherein one of which is movable by a and spaced from the other of said two elements by a distance less than the diameter of a smallest coin to be distinguished;

b. a rack, affixed to said movable element, disposed within the passageway and being moved together with said movable element in response to the insertion of coins;

c. detection means operatively connected with said rack for detecting movement of said movable element with said rack, and said movement being related to the coin diameter whereby when a coin is inserted through the passageway and is obstructed by the other of said two elements on one side of the passageway, said coin will be forced toward the other side of the passageway and displace said movable element to a distance related to the coin diameter, which displacement is detected by said detection means;

d. the detection means including:

a pinion, being attached to said rack;

a conductive wiper having a first and a second contact ends;

an arm, connecting said pinion and said conductive wiper respectively by its both ends;

an arched conductive strip and plurality of contact segments each corresponding to a particular coin size;

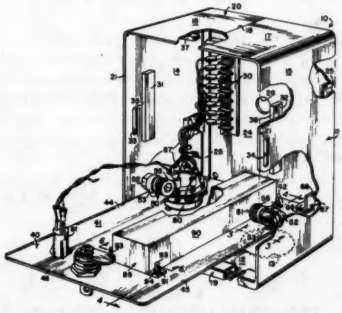
said contact segments are lined in an arc of a circle having the axle of the pinion as its center; said first and second contact ends are spaced from the axle of the pinion by a distance greater than a pitch diameter of said pinion; said conductive wiper is actuated with said pinion, and said first and second contact ends electrically contact with the conductive strip and contact segments respectively for the detection.

4,998,612

METER BOX WITH HIDDEN HINGED DOOR

Johnny H. Halsey, and James H. Halsey, both of El Dorado, Ark., assignors to IDX, Inc., El Dorado, Ark.

Filed Apr. 11, 1989, Ser. No. 336,146
Int. Cl.[5] G07F *17/20*
U.S. Cl. 194—350 **17 Claims**



1. A cabinet housing components which must be accessed for replacement or repair comprising a cabinet body defining an interior chamber adapted to house replaceable or repairable components, a door accessing said interior chamber, means for pivotally mounting said door for pivoting movement about a horizontal axis between a first generally vertically disposed position and a second generally horizontally disposed position, means for releasably locking said door in said first position, means for supporting said door in said second position whereby said door functions as a stable horizontal work surface during the replacement or repair of components adapted to be housed within said interior chamber, said cabinet body includes a pair of opposite spaced side walls, said pivotal mounting means being in part carried by each of said side walls and in part by said door, and said pivotal mounting means part carried by each of said side walls is welded to an interior surface of an associated side wall thereby being concealed from exterior view by said side walls.

4,998,613

SELF ADJUSTABLE ESCALATOR HANDRAIL DRIVE

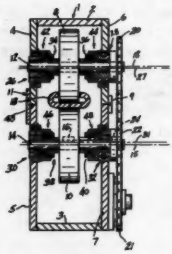
James A. Rivera, Bristol, and Gerald E. Johnson, Farmington, both of Conn., assignors to Otis Elevator Company, Farmington, Conn.

Continuation-in-part of Ser. No. 316,629, Feb. 28, 1989, abandoned.

Filed Dec. 4, 1989, Ser. No. 445,226

Int. Cl.[5] B65G *15/00*

U.S. Cl. 198—335 4 Claims



1. A handrail drive assembly for a moving handrail, said assembly comprising:

(a) first and second cooperating drive rollers mounted on rotatable drive roller shafts, said drive rollers forming a nip through which the handrail passes;

(b) rotatable end bearings supporting opposite ends of said drive roller shafts said end bearings being mounted eccentrically of said drive roller shafts;

(c) drive means for rotating said drive rollers and drive roller shafts in said end bearings whereby the axes of said drive rollers move toward each other due to the eccentricity of said shafts and bearings, to increase nip pressure on the handrail responsive to resistance to movement of the handrail;

(d) said drive rollers, shafts, bearings and drive means being mounted in a housing having two opposed component parts, one of said component parts carrying said first drive roller, its associated shaft, end bearings and drive means, and the other of said component parts carrying said second drive roller, its associated shaft, end bearings and drive means; and

(e) hinge means for separating said opposed component housing parts whereby said nip can be opened to release the handrail from the drive rollers.

4,998,614

CONVEYOR DISCHARGE CONTROL

Mark R. Riemenschneider, Maplewood, and James P. Ralidak, Wyoming, both of Minn., assignors to R. A. Jones & Co. Inc., Covington, Ky.

Filed Feb. 14, 1989, Ser. No. 311,075

Int. Cl.[5] B65G *47/26*

U.S. Cl. 198—463.4 17 Claims

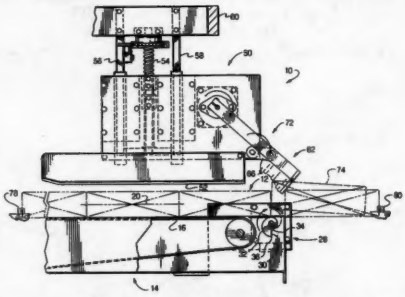
1. Apparatus for controlling the discharge of a package conveyor comprising rotary stop means located at a downstream end of said package conveyor having

(a) a generally planar first surface transverse to an axis of the conveyor,

(b) a generally volute-shaped second surface connecting a pair of opposed edges of the first surface, and

(c) an axis of rotation transverse to the longitudinal axis of the conveyor,

wherein the rotary stop means is selectively positionable to a blocking position for blocking discharge of packages from the conveyor and a discharge position for allowing discharge of packages from the conveyor and wherein the rotary stop means presents the second surface over which packages pass



when the stop means moves between the discharge and blocking positions.

4,998,615

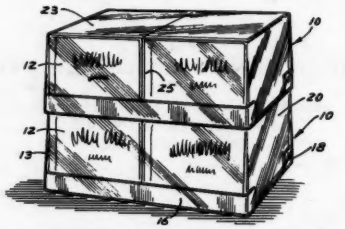
COMPOSITE TRAY AND STACKER FOR A SHRINK WRAPPED PACKAGE

Robert M. Bryan, P.O. Box 35664, Edina, Minn. 55435

Filed Oct. 2, 1989, Ser. No. 415,778

Int. Cl.[5] B65D *5/48, 5/50, 65/02*

U.S. Cl. 206—44.12 11 Claims



1. A composite tray and stacker structure mainly for a shrink wrapped package of a plurality of identical containers, said structure comprising:

(A) a rectangular tray bottom wall;

(B) a pair of relatively narrow side walls connected to opposite sides of said bottom wall along spaced apart parallel fold lines, said side walls each having a pair of fastening tabs foldably connected thereto at opposite ends;

(C) a central transverse reverse fold line across the tray bottom wall and side walls;

(D) a pair of relatively wider rectangular end walls connected along their bottom edges to opposite ends of said bottom wall along spaced apart parallel fold lines, said end walls being of a width approximately equal to the height of the containers to be packaged, and being engageable by the fastening tabs of said side walls;

(E) a pair of rectangular spacer elements each connected along one edge to one of said end walls along a fold line at the top edge of each of the end walls, the width of said spacer elements being approximately one-half the length of said walls, whereby in the assembled package said stacker elements are in face-to-face abutment; and

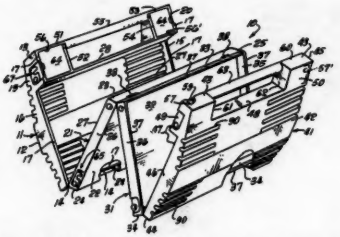
(F) a pair of rectangular weight-bearing stacker elements each connected to one of said spacer elements along a fold line along the opposite edge thereof, the width of said stacker elements being approximately equal to the width of the end walls.

4,998,616

FOUR PLY FOLD-UP DISPLAY AND CARRYING CASE

George Hillinger, Los Angeles, Calif., assignor to Alltrade, Inc., Commerce, Calif.

Filed Jul. 5, 1989, Ser. No. 375,599
Int. Cl.[5] B65D 6/04
U.S. Cl. 206—45.11 7 Claims



1. A four ply fold-up display and carrying case comprising:

a first ply comprising a generally rectangular, open compartment having an open side, an outer side, a bottom, two edge sides and a top side, each of said bottom, edge and top sides having an edge at the open side, said first ply having hinge means along the edge of the bottom;

a second ply comprising a generally rectangular, open compartment having an open side, an inner side, a bottom, two edge sides and a top side, each of said bottom, edge and top sides having an edge at the open side, said second ply having bottom hinge means along the edge of the bottom which are hingedly attached to the hinge means of said first ply, and said second ply having top hinge means along the intersection of the inner side and the top side;

a third ply comprising a generally rectangular, open compartment having an open side, an inner side, a bottom, two edge sides and a top side, each of said bottom, edge and top sides having an edge at the open side, said third ply having top hinge means along the intersection of the inner side at the top side, which top hinge means are hingedly attached to the top hinge means of the second ply, and said third ply having bottom hinge means along the edge of the bottom;

a fourth ply comprising a generally rectangular, open compartment having an open side, an outer side, a bottom, two edge sides and a top side, each of said bottom, edge and top sides having an edge at the open side, said fourth ply having hinge means along the edge of the bottom, which hinge means are hingedly attached to the bottom hinge means of the third ply;

a first pair of latch means to latch said inner sides of said second and third plies together; and

a second pair of latch means to latch the first and fourth plies together over the second and third plies whereby said case may be opened so that all plies are facing upwardly thereby displaying the contents of each ply and said case may be closed into a folded configuration and wherein the top sides of the first and fourth plies extend over the top sides of the second and third plies when the carrying case is in a folded configuration.

7. A four ply fold-up display and carrying case comprising:

a first ply comprising a generally rectangular, open compartment having an open side, an outer side, a bottom, two edge sides and a top side, said top side having a center portion, each of said bottom, edge and top sides having an edge at the open side, said first ply having hinge means along the edge of the bottom, and said top side extending past the edges of said edge sides, and said edge sides extending upwardly past the center portion of said top side;

a second ply comprising a generally rectangular, open compartment having an open side, an inner side, a bottom, two edge sides and a top side, each of said bottom, edge and top sides having an edge at the open side, said second ply having bottom hinge means along the edge of the bottom which are hingedly attached to the hinge means of said first ply, and said second ply having top hinge means along the intersection of the inner side and the top side;

a third ply comprising a generally rectangular, open compartment having an open side, an inner side, a bottom, two edge sides and a top side, each of said bottom, edge and top sides having an edge at the open side, said third ply having top hinge means along the intersection of the inner side at the top side, which top hinge means are hingedly attached to the top hinge means of the second ply, and said third ply having bottom hinge means along the edge of the bottom;

a fourth ply comprising a generally rectangular, open compartment having an open side, an outer side, a bottom, two edge sides and a top side, said top side having a center portion, each of said bottom, edge and top sides having an edge at the open side, said fourth ply having hinge means along the edge of the bottom, which hinge means are hingedly attached to the bottom hinge means of the third ply, and said top side extending past the edges of said edge sides and said edge sides extending upwardly past the center portion of said top side;

a first pair of latch means to latch said inner sides of said second and third plies together;

a second pair of latch means to latch the first and fourth plies together over the second and third plies whereby said case may be opened so that all plies are facing upwardly thereby displaying the contents of each ply and said case may be closed into a folded configuration; and

handle means supported between the portions of the top sides of the first and fourth plies which extend upwardly past said center portion of said top sides of said first and fourth plies.

4,998,617

FACIAL COSMETIC LIQUID MAKE UP KIT

James E. Ladd, Jr., Rowayton, and Francis Busch, Jr., Southbury, both of Conn., assignors to Laura Lupton Inc, Norwalk, Conn.

Filed Sep. 15, 1986, Ser. No. 907,453
Int. Cl.[5] B65D 25/08
U.S. Cl. 206—219 2 Claims

1. A kit for preparing different colors and shades of facial cosmetic liquid make up comprising:

at least one facial cosmetic liquid container having a capacity of 28.5 milliliters and containing 29 grams of a first facial cosmetic liquid said liquid when applied to the skin of a user imparting a selected one of a plurality of different basic colors to the skin, said first liquid being an oil in water emulsion with water as the exteral phase and containing a selected color; and

at least one sealed plastic pouch containing one gram of a second facial cosmetic liquid, the second liquid when combined and mixed with the first liquid in the container almost filling the container, the second liquid containing a mixture of water and a different color, the mixture when applied to the skin of a user imparting a selected one of a

different plurality of different shades associated with said selected basic color to the skin.

4,998,618

STORAGE CASE FOR OPTICAL DISCS

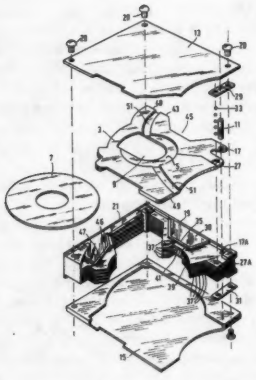
Willem J. Borgions, Louvain, Belgium, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 25, 1989, Ser. No. 302,173

Claims priority, application Netherlands, Feb. 15, 1988, 8800360

Int. Cl.[5] B65D *85/57*; G11B *23/03*

U.S. Cl. 206—307 **6 Claims**



1. A storage case for a plurality of record carrier discs, in particular optical discs, comprising a housing with superposed plate-shaped tray bodies which each comprise a supporting surface for supporting one of the said discs and moving the discs into or out of the housing are each separately pivotable about a pivotal axis which is oriented transversely of the supporting surface, the housing comprises two main walls and side walls having partitions, the side walls are oriented transverse to the main walls, the plate-shaped tray bodies are parallel to the main walls and the pivotal axis is oriented transverse to the main walls, the partitions extending parallel to said supporting surfaces, which each comprise a free edge, and which are adapted to guide and support the tray bodies when said tray bodies are situated at least partly inside the housing, and at least one of the side walls comprising an inwardly offset wall portion sunken into the housing located at a central point along its side to which a number of partition are secured.

4,998,619

CLOSE-PACK, VERTICAL-STACK WEBBING ROLL PACKAGING

Paul E. Sowa, Wheeling, Ill., and Neil D. Linnerud, Sparks, Nev., assignors to Signode Corporation, Glenview, Ill.

Filed Jun. 23, 1989, Ser. No. 370,820

Int. Cl.[5] B65D *85/67*; B65H *49/00, 75/02*

U.S. Cl. 206—392 **21 Claims**

1. A shipping package system with at least one tier of vertically-stacked webbing rolls, said package system comprising:

a stacking platform;

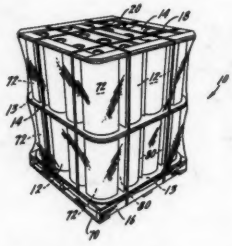
a plurality of webbing rolls, each webbing roll having a first roll end, a second roll end, and a cylindrical, tubular core with an outer diameter, a longitudinal axis, a first tube end and a second tube end extending outwardly from each of said webbing roll first and second ends, respectively;

a first pad and a second pad for each said tier of webbing rolls, each of said first and second pads having a center, a plurality of first passages, a plurality of sets of second passages for receiving tube ends, each of said sets of second passages operable with one of said first passages and radially, outwardly displaced from said center and said first passages;

at least one of said pads positioned on said stacking platform;

each of said first and second passages of one of said first and second pads in alignment with an opposed first and second passage in the other of said first and second pads,

webbing roll tube cores with webbing rolls thereon extending approximately normally between and into each of said aligned first and second passages of each pair of first and second pads, said webbing rolls movable in said second passages to tangentially contact at least two of said webbing roll of said tier, and,



means for securing, which means for securing extends around said pads and platform to secure said pads and webbing rolls to said platform.

4,998,620

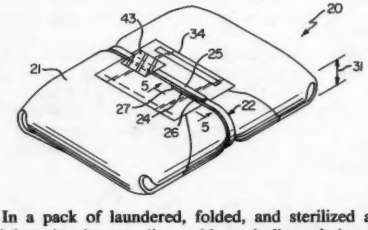
STERILIZED PACK OF FABRIC ARTICLES

Jeffrey L. Taylor, Cincinnati, Ohio, assignor to Standard Textile Company, Inc., Cincinnati, Ohio

Division of Ser. No. 149,363, Jan. 28, 1988, abandoned. This application Jun. 2, 1989, Ser. No. 360,361

Int. Cl.[5] B65D *85/16*; A61B *19/00*

U.S. Cl. 206—440 **5 Claims**



1. In a pack of laundered, folded, and sterilized articles which have band means disposed in encircling relation around said pack and holding same in a compact manner, the improvement wherein said band means has overlapping fused end portions and said band means is made of a material which does not contaminate said pack, said band means being made of a flat strip of thermoplastic material, said overlapping fused end portions comprising an inner end portion and an outer end portion which are fused at a particular location of said band means, said fused end portions at said particular location having a given fused length, said inner end portion has a terminal end which extends beyond said location, said terminal end has a graspable length , said terminal end with its graspable length being adapted to be first rotated approximately 180 degrees to expose same so that it can be grasped manually to separate said end portions at said location and thereby remove said band means from said encircling relation, and further comprising a card disposed between said pack and said flat strip, said card being made of a material that does not contaminate said pack, said card serving to provide data identifying the contents of said pack and providing data relating to sterilization and shelf

life of said pack, and adhesive tape means engaging only an outside surface of only said card and said flat strip, said adhesive tape means holding said card in position against said flat strip, said adhesive tape means also having indicator means which indicate whether said tape means and its pack have been subjected to a sterilization environment.

4,998,621

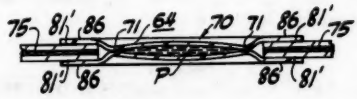
PACKAGE FOR A LIQUID SAMPLE AND AN ASSOCIATED METHOD FOR PACKAGING A LIQUID SAMPLE

Frank Meehan, 203 Cathedral Ave., Hempstead, N.Y. 11550

Continuation-in-part of Ser. No. 392,343, Aug. 11, 1989, Pat. No. 4,941,574. This application May 22, 1990, Ser. No. 526,829

Int. Cl.[5] B65D *75/28*

U.S. Cl. 206—466 **35 Claims**



1. A package for a liquid sample comprising a sealed envelope including a pocket containing a liquid sample, relatively rigid support means engaging said envelope around at least a portion of the periometer thereof and providing an opening in which the pocket of the envelope including the liquid sample is received in recessed relation below outer surfaces of the support means and means permitting separation of said envelope from said support means in intact sealed state by application of force to said envelope at said opening, said flexible envelope comprising a film material which extends on and around said relatively rigid support means.

14. A package for a sample of material comprising relatively rigid support means, flexible material supported by said rigid support means, said support means having an opening, said flexible material including two flaps, separable seal means joining said two flaps of said flexible material for defining a sealed pocket which is exposed in said opening, a sample of material in said pocket, one of said flaps of said flexible material, being secured to said support means, the other flap being free and disconnected from said support means for being pulled away from said support means for separating said seal means to open said pocket and expose the sample of material while said one flap remains fixed to said support means.

29. A package for a liquid sample comprising a flexible envelope including a sealed pocket containing a liquid sample, relatively rigid support means engaging said envelope around at least a portion of the perimeter thereof and providing an opening in which the pocket of the envelope including the liquid sample is receivable in recessed relation below outer surfaces of the support means, and means permitting separation of said envelope from said support means in intact sealed state by application of force to said envelope, said flexible envelope comprising two flaps and seal means sealably joining said flaps together to form said pocket.

33. A packaging method comprising:

sealing a sample of material in a pocket of a flexible material which has one flap affixed to a rigid support means and a second flap in juxtaposed relation with said one flap, said pocket being formed by sealing said juxtaposed flaps, said pocket being located at an opening which is formed in said rigid support means, and

opening said pocket to gain access to said sample by displacing said second flap away from said first flap to break the seal around the pocket while said one flap remains affixed to said rigid support means.

4,998,622

PLASTIC PAIL AND LID

Alfred Drack, Agathaberg 21, D-5272 Wipperfurth, Fed. Rep. of Germany

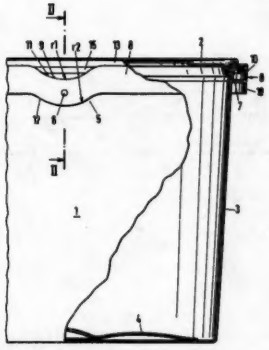
PCT No. PCT/EP88/00325, § 371 Date Oct. 6, 1989, § 102(e) Date Oct. 6, 1989, PCT Pub. No. WO88/07962, PCT Pub. Date Oct. 20, 1988

PCT Filed Apr. 16, 1988, Ser. No. 424,212

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1987, 8705705; Nov. 4, 1987, 8714684

Int. Cl.[5] B65D *21/02*

U.S. Cl. 206—519 **2 Claims**



1. In combination, a plastic pail and lid comprising a base (**4**), a wall (**3**) widening conically from said base towards and upper rim of said pail, said upper rim being constructed to support and seal a lid (**2**); said wall having two pockets disposed at outer circumferences of the wall below said upper rim and at diametrically opposite points, each pocket being provided with a hole (**6**) to receive a carrying handle, and said plastic lid; said pockets being part of a cylindrical ring (**8, 28**) concentrically enclosing said wall (**3, 23**), said ring being supported by an annular disk-shaped support ring (**7, 27**) which projects radially from said in proximity of said upper rim, wherein the cylindrical ring, is drawn down arcuately towards the base at two diametrically opposite points of said circumference to permit said lid to be gripped, and wherein said arcuately downdrawn points of the cylindrical ring are bounded on upper arcs (**9, 29**) and on a lower side (**12, 32**) by arcs of equal radii (**r1, r2**) to permit a circular alignment of nested pails without lids; said pail having a degree of conicity in a region of the rim and an interval between said cylindrical ring and pail wall and width of the cylindrical ring which extends downwards from the support ring, to ensure that the cylindrical rings are braced upon each other when stacked or at least approach each other sufficiently through engagement of their arcuate points in a circumferential direction.

4,998,623

MEDICATION DISPENSING PACKAGE

Hubert K. Doull, Cedar Rapids, Iowa, assignor to Omni Medical Systems Inc., Marion, Iowa

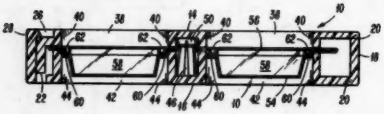
Filed Apr. 27, 1990, Ser. No. 515,199

Int. Cl.[5] B65D *83/04, 3/26, 5/54*

U.S. Cl. 206—531 **8 Claims**

1. A dispenser for storing and dispensing medication in the form of pills such as tablets or capsules, said dispenser comprising a carrier having a top portion and a bottom portion adapted to be engageable with the top portion when the carrier is closed, the top portion having a plurality of openings, an inwardly extending rim around each such opening, the bottom portion having a plurality of openings corresponding in size, number and position to the openings in the top portion, an

inwardly extending rim around each of the openings in the bottom portion, the rims around the openings in the top portion being positioned so as to be in alignment with the corresponding rims around the openings in the bottom portion when the top portion is closed onto the bottom portion, a disposable blister having a top portion and a bottom portion, a plurality of pockets for receiving pills in the bottom portion of the blister, each of the pockets corresponding in approximate size, number and position to the openings in the bottom portion of the carrier so that the bottom portion of the blister can be inserted into the carrier with the pockets seated in the openings in the bottom portion of the carrier, each of the pockets being surrounded by an indentation, and a plurality of downwardly extending rims formed in the top portion of the blister which rims correspond in position and shape to the indentations around the pockets in the bottom portion of the blister, portions of the blister around and outside each rim having cuts extending through the blister, the rims in the top and bottom portions of the carrier being engageable with the rims and indentations in the blister when the blister is inserted in the carrier so as to force the rims in the top portion of the blister into the indentations when the carrier is closed to thereby form a seal over and around each of the pockets, the cuts in the top portion of the blister around each of the rims providing for removal of the pill from the pocket.

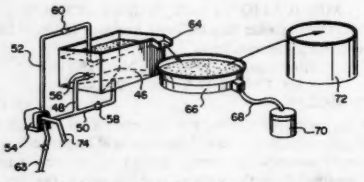


4,998,624

METHOD OF SEPARATING CARBONACEOUS COMPONENTS FROM PARTICULATE COAL CONTAINING INORGANIC SOLIDS AND APPARATUS THEREFOR

C. Edward Capes, Ottawa; Richard D. Coleman; Joseph L. S. Croteau, both of Orleans, and William L. Thayer, Ottawa, all of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Continuation of Ser. No. 865,662, May 22, 1986, abandoned.
Filed Nov. 16, 1989, Ser. No. 437,763
Claims priority, application Canada, May 30, 1985, 482843
Int. Cl.[5] B03D *1/02*
U.S. Cl. 209—5 **2 Claims**



1. A method of separating the carbonaceous components of coal from the non-carbonaceous inorganic solids contained in previously formed agglomerates, which agglomerates are formed by agitating a first water slurry of particulate coal and oil to form the agglomerates and then separating the so formed agglomerates from the slurry, comprising the steps of:

(1) mixing in water said previously formed agglomerates to form a second water slurry thereof;

(2) sufficiently agitating the second slurry and positively introducing a sufficient amount of air into the second slurry to:

(a) deagglomerate the previously formed agglomerates and separate the particulate coal from the inorganic solids;

(b) allow the separated particulate coal to reagglomerate into more dense and robust reagglomerates than that of the previously formed agglomerates and have reduced amount of inorganic solids therein compared with the previously formed agglomerates; and

(c) entrap sufficient air in and around the reagglomerates that the reagglomerates are more buoyant than the previously formed agglomerates;

(3) allowing the reagglomerates to float to the top of the second water slurry; and

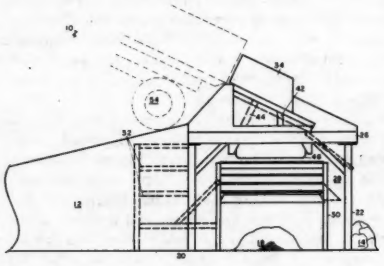
(4) separating and recovering the reagglomerates with the reduced inorganic solids therein.

4,998,625

RIPRAP SEPARATION APPARATUS AND METHOD

James L. Read, Middleboro, Mass., assignor to The Read Corporation, Middleboro, Mass.

Filed Oct. 21, 1988, Ser. No. 260,592
Int. Cl.[5] B07B *9/00, 1/28*
U.S. Cl. 209—234 **14 Claims**



1. A separation apparatus which apparatus comprises in combination:

(a) a support frame having a front, back and one and the other sides, with at least one side of said apparatus open to provide an open internal space within the support frame;

(b) an upper grizzly element on the top of the support frame having a one and other end, which grizzly element comprises:

(i) a first receiving hopper means to receive riprap-type material to be separated;

(ii) a plurality of generally parallel, spaced apart, horizontally fixed bar elements extending from the front toward the back of the support frame to separate the received riprap into the first large riprap material which does not pass through the spaces of the bar elements and small riprap material which passes through the spaces of the bar elements;

(c) means to tilt the grizzly element about an axis at the one end between a horizontal position and an upright angle of about 75° to aid in the removal of the first large riprap material from the surface of the bar elements by angular movement of the bar elements of the grizzly element and to provide an angular sloping surface for the discharge of the first large riprap material;

(d) a downwardly angled discharge ramp means adjacent the one end of the grizzly element and adapted to receive

the first large riprap material from the grizzly bar elements and to discharge said large riprap material form the discharge ramp means into a separated first large riprap material of defined size on the ground adjacent the back of the support frame;

(e) a second receiving hopper means within the open space of the support frame to direct the small riprap material passing through the upper grizzly element on a defined downward path in said open space;

(f) support means to provide for attachment to a sloping earthen ramp means adjacent the apparatus;

(g) a sloping earthen ramp means to provide an angled ramp for the movement of vehicles and extending up to the first receiving hopper means to permit the discharge of riprap material from said vehicles directly into the first receiving hopper means; and

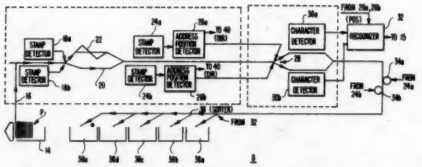
(h) screen-type soil separating means within the said open space to receive said small riprap material from the second hopper means and to separate the small riprap material into a second riprap material and a third riprap material of defined sizes, the third material deposited and separated and reachable for the removal within the said open space and beneath the screen-type soil separating means, and the second material separately deposited and separated outside of the separation apparatus thereby providing an apparatus for the separation of the riprap material into at least three distinct, classified, separate materials.

4,998,626

MAIL PROCESSING MACHINE

Naoki Ota, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Jul. 8, 1988, Ser. No. 216,287
Claims priority, application Japan, Jul. 8, 1987, 62-170198
Int. Cl.[5] B07C *5/342*; G06K *9/00*
U.S. Cl. 209—584 **7 Claims**



1. Apparatus for selecting pieces of mail having a printed destination address from among pieces of mail having printed and handwritten destination addresses, wherein the mail pieces have an undelineated destination address area including a destination address consisting of a plurality of alpha-numeric characters, the apparatus comprising:

means for detecting the position of only the undelineated destination address area on a piece of mail;

means for scanning only a portion of the undelineated destination address area and for generating signals representative of alpha-numeric characters within the scanned portion of the undelineated destination address area;

means for calculating the dispersion of a characteristic of the alpha-numeric characters within the scanned portion of the destination address area;

means for comparing the calculated dispersion to a predetermined limit; and

means for selecting the piece of mail as having a printed address when the dispersion is less than the predetermined limit.

4,998,627

LID HOLDER RACK

Marlene K. Elder, 7444 Covey Rd., Forestville, Calif. 95436

Filed Feb. 26, 1990, Ser. No. 484,979
Int. Cl.[5] A47F *5/00*
U.S. Cl. 211—13 **3 Claims**

1. A lid holder rack for securement of a lid defined by a central body with a shank directed outwardly and medially of the central body terminating in an enlarged end, the lid rack comprising,

an elongate forward support member including a plurality of spaced recesses directed downwardly relative to an upper edge of the support member, and

right and left side legs directed rearwardly of the support member and orthogonally and integrally secured to side edges of the support member and right and left securement legs including an aperture formed medially thereof directed through each securement leg with each securement leg orthogonally and integrally secured to each side leg and directed exteriorly of each side leg wherein each aperture is arranged for reception of a fastener therethrough for securement of the rack to a vertical support surface, and

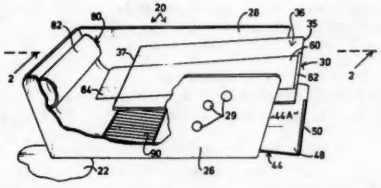
wherein each intersection of each side leg relative to the forward support member includes an elongate cylindrical groove coextensive with the intersection defined between each side leg and the forward support member and arranged at an apex defined by an intersection defined by interior surfaces of the forward support member and side legs, and securement means selectively mounted within each cylindrical groove for securement of lid members to the forward support member.

4,998,628

GRAVITY-OPERATED BOTTLE AND CAN DISPENSING RACK

E. Richard Ross, Hot Springs, Ark., assignor to Roll-A-Bot, Inc., Hot Springs, Ark.

Filed Apr. 17, 1989, Ser. No. 339,095
Int. Cl.[5] A47F *7/00*
U.S. Cl. 211—59.2 **17 Claims**



17. A gravity-operated rack for storing and subsequently dispensing bottles and cans, said rack comprising:

a rigid frame having a front, rear, and interior said frame adapted to be disposed upon a supporting surface, said frame comprising a pair of rigid, vertically upright, spaced-apart sides and rigid rear wall means for bracing said frame said rear wall means extending between said sides;

an access end conveniently disposed at the front of said frame for receiving and discharging bottles and cans;

a transfer throat defined in the interior of said frame adjacent said rear wall means;

a lengthwise and edgewise inclined input shelf for rolling said bottles and cans from said access end toward said transfer throat;

a lengthwise and edgewise inclined discharge shelf disposed beneath said input shelf for receiving said bottles and cans from said transfer throat and rolling them toward said rack access end; and,

selectively adjustable tongue means slidably associated with said input shelf for selectively varying the length of the input shelf to control passage of said bottles and cans through said throat.

4,998,629

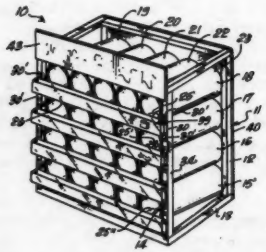
DISPLAY AND STORAGE RACK

Se L. Cheng, Duarte, Calif., assignor to Alltrade, Inc., Commerce, Calif.

Filed Jun. 8, 1989, Ser. No. 363,162

Int. Cl.[5] A47G *29/00*

U.S. Cl. 211—71 **9 Claims**



1. A display and storage rack for showing, holding, and permitting the withdrawal of stored items, said rack comprising:

a frame having a base, a front and a back, said frame being supported on a horizontal floor;

at least one row of hollow tubes held by said frame, each of said tubes having an open front, a closed rear and a longitudinal axis, each of said tubes being supported at an angle between 10 and 45 degrees with respect to the horizontal floor, wherein the front and rear of each tube is cut so that it is vertical and in the same vertical plane relative to the horizontal floor as every other tube, and the rear is closed by a single sheet of material secured to the back of said frame;

a barrier and display strip supported along the front of each of the hollow tubes, said strip extending horizontally and extending upwardly from the lower most portion of each open front so as to cover at least ten and no more than fifty percent of said open front.

4,998,630

ORGANIZED STORAGE FOR MISCELLANEOUS PARTS

Josephine M. Schwartz, 1642 Buckhorn La., Billings, Mont. 59105

Filed Oct. 14, 1988, Ser. No. 257,637

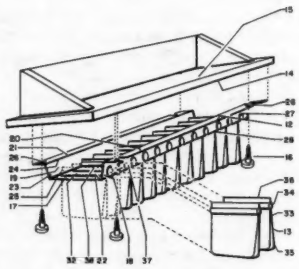
Int. Cl.[5] A47G *29/00*

U.S. Cl. 211—71 **1 Claim**

1. A storage device comprising, in combination:

a. a support structure, said support structure comprising a plurality of generally horizontal, parallel, downwardly opening channels, each channel having at least one open end, each opening being defined by a slot which is narrower than the crossectional dimension of said channel, said support structure having a mounting means for suspending said support structure from a generally horizontal mounting surface; and

b. a plurality of storage bags, each of said storage bags having a main part which is thin and joined at lateral sides and at the bottom in a monolithic manner leaving the top end open, said open end having a thicker portion, a thinner portion being defined just below said thicker portion, whereby, said thicker portion is slidably inserted through



said open end into said channel whereby said thinner portion extends through said slot wherein said bags are suspended from said support structure.

4,998,631

WINE RACK

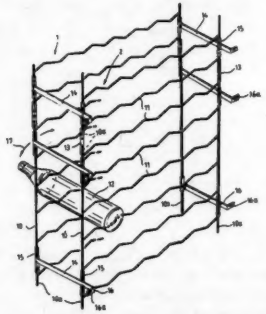
Michael Fridjhon, 27 Durris Rd., Forest Town, Johannesburg, Transvaal, R.S.A., South Africa

Filed Sep. 27, 1989, Ser. No. 413,339

Claims priority, application South Africa, Jan. 26, 1989, 89/0620

Int. Cl.[5] A47B *73/00*

U.S. Cl. 211—74 **8 Claims**

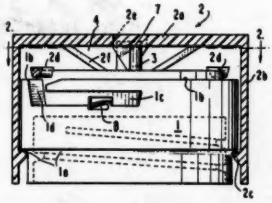


1. A wine rack comprising a pair of support members each defining a plurality of cradle formations for receiving an article such as a wine bottle, and one or more brace elements which extend between the support members to secure the support members to one another in spaced relationship with opposed cradle formations aligning with one another when the rack is in an assembled state so that in use these are capable of supporting a wine bottle in a generally horizontal attitude; the brace elements being pivotally mounted on the support members to enable said support members to pivot on to one another into a collapsed configuration; and anchoring means for securing the wine rack in its assembled state to a support, the anchoring means comprising brackets which are defined an extension of the brace elements so that when the anchoring means is secured to a support, the brace elements are locked against pivotal movement.

4,998,632
CONDITION INDICATING CHILD-RESISTANT CAP

Glenn H. Morris, Sr., 1192 Cumberland Rd., Chattanooga, Tenn. 37419

Filed Oct. 30, 1989, Ser. No. 428,775
Int. Cl.[5] B65D *55/02*
U.S. Cl. 215—201 20 Claims



1. A child-resistant cap assembly comprising, an inner cap adapted to be threadably mounted on a container, an outer cap mounted on said inner cap, means interconnecting the inner and outer caps, whereby the inner cap is captivated within the outer cap and they are movable axially and freely rotatable relative to each other, the inner cap having a top wall and a depending side wall, said top wall of said inner cap having a peripheral edge portion, said outer cap having a top wall and a depending side wall, radially inwardly extending flange means on the inner wall surface of the outer cap side wall, said flange means engaging the peripheral edge portion of the top wall of the inner cap, whereby the outer cap is held upwardly in spaced relationship to the inner cap, and the cap assembly is in a child-resistant mode, wherein the outer cap is freely rotatable on the inner cap.

4,998,633
STOPPER FOR A CONTAINER SUCH AS A BOTTLE AND INCLUDING SLIT VALVE STRUCTURE, FOR USE WITH A PUMP FOR ALTERING AND THEREAFTER MAINTAINING ALTERED PRESSURE IN THE CONTAINER

Bernardus J. J. A. Schneider, Churchillaan 60, 2625 GW Delft, Netherlands

Division of Ser. No. 230,072, Aug. 9, 1988, Pat. No. 4,911,314, which is a division of Ser. No. 3,784, Jan. 15, 1987, Pat. No. 4,763,803. This application Jan. 30, 1990, Ser. No. 472,332
Claims priority, application Netherlands, Jan. 20, 1986, 8600111
The portion of the term of this patent subsequent to Aug. 16, 2005, has been disclaimed.
Int. Cl.[5] B65D *51/16*
U.S. Cl. 215—311 7 Claims

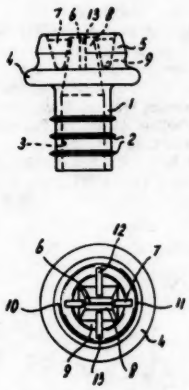
1. An integral valve controlled stopper for insertion in an opening in a container and adapted to have a pump attached thereto for controlling the pressure inside the container, comprising:

a stopper having a shaft with a channel therein;

a slit valve positioned across and adapted to open and close said channel;

said slit valve comprising a horizontal rib having a slit therein with said rib positioned on tapering outer walls which merge with said channel;

a first pair of aligned ribs on opposite ends of said slit and a second pair of aligned ribs transverse to said slit attached to said tapering outer walls for assisting in the support of

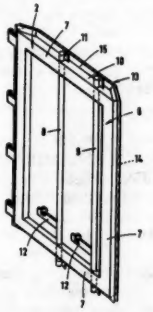


said slit valve in said stopper and the opening and closing of the valve in operation.

4,998,634
CONTAINER DOOR

Stanley Nessfield, Driffield, England, assignor to Sea Containers Ltd, London, England

PCT No. PCT/GB88/00650, § 371 Date Feb. 9, 1990, § 102(e) Date Feb. 9, 1990, PCT Pub. No. WO89/01449, PCT Pub. Date Feb. 23, 1989
PCT Filed Aug. 5, 1988, Ser. No. 460,886
Claims priority, application United Kingdom, Aug. 13, 1987, 8719172
Int. Cl.[5] B65D *97/00*
U.S. Cl. 220—1.5 8 Claims



8. A container for carrying cargo including a door comprising two major opposed sides between which extends an outer peripheral edge surface, locking means (8, 9) mounted on the door (2, 3) within the profile of the door so that the locking means extends beyond the outer peripheral edge surface of the door and seal means located on this door for sealing the door within a door frame of the container, characterized in that the seal means (13) extends around the outer peripheral edge surface of the door for engagement with the container door frame for sealing the door relative to the container, the seal means and locking means lying substantially in the same plane extending through the door parallel to the two major sides and where the locking means extends beyond the outer peripheral surface

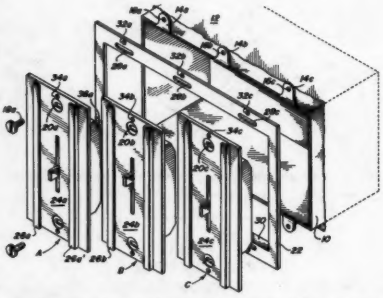
the seal means is offset relative to the locking means thereby to minimize the effective door thickness and maximize the cargo loading area within the container.

4,998,635

MOUNTING FRAME FOR GANGED ELECTRICAL DEVICES

Timothy Vink, Allentown; Robert F. Burkholder, Emmaus; Michael J. D'Aleo, Erwinna; Andrew Elsbury, Allentown, all of Pa.; Woodie Flowers, Weston, Mass.; Richard Lordo, and Shawn R. McCall, both of Allentown, Pa., assignors to Lutron Electronics Co., Inc., Coopersburg, Pa.

Filed Feb. 2, 1989, Ser. No. 305,883
Int. Cl.[5] H02G *3/00*
U.S. Cl. 220—3.4 **12 Claims**



1. A multigang electrical assembly comprising, in combination,

a plurality of adjacent electrical devices mountable into a switchbox,

a single snap-on faceplate engaging each of said devices, and

a frame providing a rigid planar mounting surface for said devices between said devices and said switchbox,

said frame comprising a substantially rectangular first plate, having:

a front surface, having a plurality of alignment markers for independently positioning each of said devices in juxtaposition to receive said faceplate,

(b) a back surface,

(c) a substantially rectangular opening, and

(d) a plurality of holes positioned to permit alignment with holes in said switchbox.

4,998,636

ELECTRONIC RACK AND MOUNTING FRAME

James S. Hardigg, South Deerfield, Mass., assignor to Hardigg Industries, Inc., South Deerfield, Mass.

Filed Jun. 30, 1989, Ser. No. 373,392
Int. Cl.[5] F16B *7/00*
U.S. Cl. 220—4.34 **16 Claims**

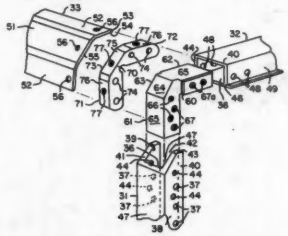
1. An electronic rack and mounting frame for shipping and handling sensitive electronic equipment modules, comprising:

a plurality of hollow, substantially rectangular shaped vertical frame members having front, rear and a pair of sidewalls and distal ends, said distal ends of said vertical frame members having a cutout portion in one of said sidewalls;

a plurality of hollow, substantially rectangular shaped horizontal frame members having front, rear and a pair of sidewalls and distal ends;

a plurality of side frame members having distal ends;

first connecting means disposed within the hollow interior of said vertical and horizontal frame members for detachably securing said distal ends of said vertical frame members to said distal ends of said horizontal frame members to form a front frame panel and a rear frame panel, said first connecting means comprising an L-shaped, internal splice member having a vertical leg portion and a horizontal leg portion joined together at right angles at a central portion, said vertical leg portion and said central portion being disposed in the hollow interior of said vertical frame member; and



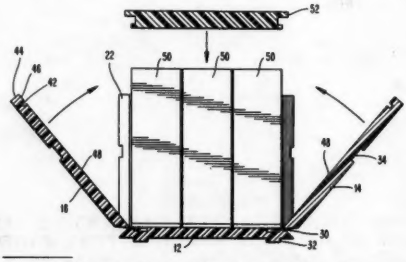
second connecting means for detachably securing said distal ends of said side frame members to said front and rear frame panels said second connecting means comprising an L-shaped external splice member having a vertical leg portion and a horizontal leg portion joined together at right angles at a central portion.

4,998,637

SHIPPING CONTAINER FOR PACKING UNITS

Harijs B. Marovskis, Seymour, Conn., assignor to Tetra Pak Holdings & Finance S.A., Pully, Switzerland

Filed Dec. 12, 1988, Ser. No. 282,561
Int. Cl.[5] B65D *19/00*
U.S. Cl. 220—6 **7 Claims**



1. A foldable shipping container for packing units comprising:

(a) a bottom section;

(b) first and second side walls integrally connected to said bottom section along first and second folding lines, respectively;

(c) first and second end walls integrally connected to said bottom section along third and fourth folding lines, respectively, said first and second side walls and said first and second end walls each having an interior side and an exterior side, the exterior side of each wall having a channel extending substantially parallel to said folding lines and strap means in said channel for securing each of said side walls and end walls in a position substantially perpendicular to said bottom section, said first and second side walls having a groove in said interior side extending substantially the length of said side walls;

(d) a plurality of recesses provided in a first side of said bottom section;

(e) a plurality of protrusions extending from a second side of said bottom section and said protrusions being aligned with said recesses, wherein said first and second side walls and said first and second end walls may be folded together along said first, second, third and fourth folding lines to

define a container adapted to receive a plurality of individual packages; and

(f) a top section provided in said groove so as to define a closed container of predetermined volume and including a tongue portion received in said groove, a lip portion extending over an edge of said side walls opposite said folding line and a gap defined between said tongue portion and said lip portion to receive an extension of said side walls.

4,998,638

CAN AND METHOD OF MANUFACTURING THE SAME

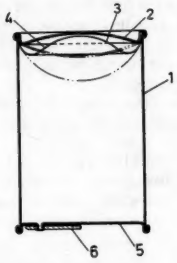
Seizi Kawamata, Ohmiya, Japan, assignor to Nihon Seikan Kabushiki Kaisha, Saitama, Japan

Continuation of Ser. No. 724,789, Apr. 18, 1985, abandoned, which is a continuation of Ser. No. 539,959, Oct. 7, 1983, abandoned. This application Apr. 7, 1986, Ser. No. 849,368

Claims priority, application Japan, Oct. 26, 1982, 57-187864

Int. Cl.[5] B65D *6/30, 51/18*

U.S. Cl. 220—626 **12 Claims**



1. In a can to be packed with heated contents, said can including a can body formed of a material having a relatively low pressure resistance and opposite first and second ends to be sealingly closed, the improvement comprising means for, upon cooling of the heated contents, preventing deformation of said can body as a result of the generation therein of negative pressure, said preventing means comprising closure means for covering a first said end of said can body while absorbing said negative pressure, said closure means comprising:

an imperforate end plate having a periphery sealingly secured to said can body and a nonplanar, nonperforated central portion, said end plate being formed of a material capable of being deformed inwardly;

an imperforate flexible film member stretched across said can body inwardly of said end plate and having a periphery secured to said periphery of said end plate, said film member being formed of a material capable of inward deflection upon the generation within said can body of said negative pressure; and

a predetermined sealed space maintained between said end plate and said film member and forming cushioning means for, upon initial inward deflection of said film member resulting from initial negative pressure within said can body due to initial cooling of contents therein, followed by inward deformation of said end plate, enabling further inward deflection of said film member to absorb further negative pressure generated within said can body due to further cooling of contents therein, without deformation of said can body.

4,998,639

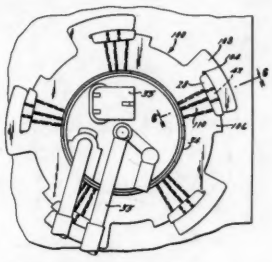
FUEL SENDER LOCKING RING

Robert D. Seizert, Canton, and James R. Osborne, Pontiac, both of Mich., assignors to Solvay Automotive, Inc., Houston, Tex.

Filed Oct. 10, 1989, Ser. No. 419,486

Int. Cl.[5] B65D *41/06*

U.S. Cl. 220—85 F **21 Claims**



1. A fuel tank assembly comprising:

a hollow pressurizable tank for storing liquid fuel and having an aperture extending through a generally planar external surface;

a fuel sender unit at least partially disposed within said aperture and having a radially extending shoulder having generally parallel planar first and second surfaces, said second surface adapted for mating contact with said external tank surface so as to enclose said tank aperture;

sealing means disposed between said second surface of said fuel sender unit and said external surface of said tank for producing a fluid-tight seal therebetween;

a plurality of retaining lugs having a first leg member extending substantially perpendicular from said external surface of said tank, said first leg member having a first and second surface, and a second leg member continuous with and extending generally orthogonally from an end of said first leg, said retaining lugs located around the periphery of said aperture and radially outward of said shoulder of said fuel sender unit; and

a locking ring having engaging means for lockingly engaging said second leg member of said retaining lugs, said engaging means adapted to coact with said second leg member of said retaining lugs to bias said fuel sender shoulder against said external tank surface and said seal means for locking said fuel sender unit to said tank at a position radially inward of said first leg first surface, said locking ring further comprising one or more tabs for surrounding said second surface of said first leg of said retaining lugs, said tabs inhibiting permanent radially outward deformation of said retaining lugs due to increased pressure within said tank.

4,998,640

PARALLELEPIPEDIC CONTAINER

Gustav D. Edelhoff, Iserlohn, Fed. Rep. of Germany, assignor to Edelhoff Polytechnik GmbH & Co., Iserlohn, Fed. Rep. of Germany

Filed Jun. 27, 1989, Ser. No. 371,998

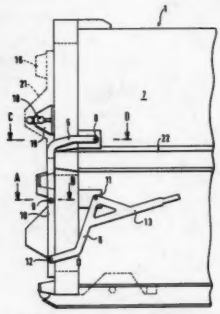
Claims priority, application Fed. Rep. of Germany, Jun. 27, 1988, 8808225[U]; Jul. 25, 1988, 3825184; Jul. 25, 1988, 8809465[U]

Int. Cl.[5] B65D *90/02*

U.S. Cl. 220—262 **4 Claims**

1. In an improved parallelepipedic container comprising a generally rectangular body having top, bottom side and end walls and an entrance opening provided in one end wall for introducing material into said container, and which end wall is closed by a flap or cover provided with side edges, the improvement comprising providing parallel motion links on said container, the outer ends of said parallel-motion links being

pivoted to the side edges of said flap or cover and the inner ends of said parallel-motion links being pivoted to pins connected to the sidewalls of said container, actuating means connected to said parallel motion links for pivotally moving the flap or cover between closed and open positions, and said



parallel motion links forming a four bar locking means for locking said cover in its closed position, said flap or cover having a hoodlike bulge, which, when the flap or cover is in its closed position, covers any fixtures which protrude from the opening of the container and which may consist of protruding fixing lugs.

4,998,641

TOP FOR BEVERAGE CAN

D. Dean Willoughby, 1630 Fremont Ave., Cheyenne, Wyo. 82001

Filed Nov. 29, 1989, Ser. No. 442,949

Int. Cl.[5] B65D *41/32*

U.S. Cl. 220—268 **8 Claims**

1. An improved top member for a beverage container of the type including a horizontal member, a scored portion which is adapted to be displaced from the plane of said horizontal member to provide an opening in said top member having two side edges, a front edge and a rear edge, and means for displacing said scored portion from said horizontal member; wherein the improvement comprises raised portions adjacent said scored portion, wherein said raised portions include an upper surface which has a curved cross-section; wherein said raised portions project upwardly from the plane of said horizontal member at least about 1/16 inch; and wherein said raised portions extend along the full length of said opening and past said rear edge thereof; wherein said raised portions are integral with said horizontal member; and wherein said raises portion which is adjacent said front edge of said opening is lower than said raised portions which are adjacent said side edges of said opening.

4,998,642

PLASTIC SEALING COVER

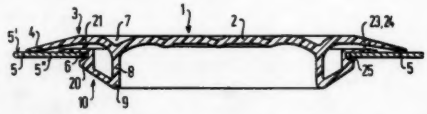
Willibald Kraus, Grünstadt, Fed. Rep. of Germany, assignor to TRW United Carr BMBH & Co., Enkenbach-Alsenborn, Fed. Rep. of Germany

Filed Aug. 31, 1989, Ser. No. 401,227

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1988, 3831433

Int. Cl.[5] B65D *39/00*

U.S. Cl. 220—307 **13 Claims**



1. A plastic closure member for sealing insertion in an opening in a panel having first and second opposed faces, said closure member comprising:

a bottom element having a peripheral sealing lip joined thereto and adapted to sealingly engage the first face of the panel circumferentially about said opening;

a sealing catch ring assembly carried by the bottom element at a location axially spaced from the sealing lip, the sealing catch ring assembly adapted to retain the closure member in the panel opening and including first and second circumferentially continuous sealing surfaces for respectively engaging the first and second opposed faces of the panel circumferentially of the panel opening, said circumferentially continuous sealing surfaces being respectively defined by a circumferential protrusion and an axially spaced sealing flange;

said sealing flange comprising a first portion which extends radially and a second portion which is inclined axially; and,

said catch ring assembly joining to the bottom element through a web-like stay member which extends diagonally outward in a generally radial direction from a crown member that extends axially from the bottom element.

4,998,643

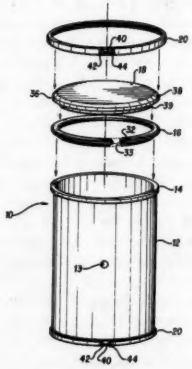
COMPOSITE WINE AGING CONTAINER

Bernard J. Pradel, 2100 Hoffman La., Napa, Calif. 94558

Filed May 8, 1990, Ser. No. 520,560

Int. Cl.[5] B65D *45/32*

U.S. Cl. 220—600 **3 Claims**



1. A composite container for aging wine which is required to be aged in wood comprising:

a cylindrical metal drum having two full open heads at both

ends thereof, including an annular flange protruding outward from the metal drum at each end and a central refill opening in a side of said cylindrical metal drum for periodic addition of wine thereto;

two circular oak end covers of solid construction for closure of the cylindrical metal drum and to impart controllable amounts of tannin flavor to the wine, each circular oak end cover having interior and exterior surfaces with a shoulder portion and a hub section disposed between the interior and exterior surfaces, said interior surfaces of the end cover being shaped complementary to each of said open heads at each end of the metal drum;

two ring gaskets, each disposed in sealing engagement between said annular flange and each of said circular oak end covers;

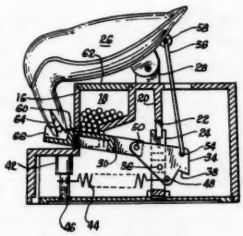
two locking rings having an adjustable mechanisms secured thereto, each locking ring being disposed on the outer periphery of each circular oak end cover and said annular flange to effect a fluid-tight releasable seal.

4,998,644

TOOTHPICK DISPENSER

Hsu C. Pan, Tan-Tze, Taiwan, assignor to Palomar Importer & Wholesaler Co. Inc., San Diego, Calif.

Filed Jul. 5, 1989, Ser. No. 375,676
Int. Cl.[5] A47G *21/12*; B65D *83/02*
U.S. Cl. 221—24 **1 Claim**



1. A toothpick dispenser comprising:

(a) a housing;

(b) a toothpick hopper in said housing;

(c) a tray operatively mounted in said housing, said tray having a holder for a single toothpick, said tray being movable from a loading position in which said holder receives a toothpick from said hopper to a presentation position in which said holder presents a toothpick therein for pickup:

(d) a toothpick gripper pivotally mounted to said housing and being movable from a static position to an extended position in which it grips a toothpick in said holder;

(e) biasing means for biasing said gripper back into its static mode after a toothpick has been gripped thereby;

(f) a coupling mechanism coupling said tray and said toothpick gripper such that movement of said toothpick gripper into said extended position concomitantly moves said tray from a loading position to said presentation position;

(g) said tray being slidable substantially horizontally but with an upward rotation of the extending end from a position with said toothpick holder beneath said hopper to said presentation position, said coupling mechanism including a stationary internal frame member pivotally mounting a pivot plate pivotally connected to said tray and also to a rod connected to said toothpick gripper such that movement of said gripper moves said rod which pivots said plate which moves said tray whereby all movement which extends said tray and lowers said gripper toward said tray is positive and independent of extension spring;

(h) said gripper having a cleft which swings down to wedgingly grip a toothpick in said holder when said gripper is swung into its extended position;

(i) said gripper being in the shape of a bird, and said cleft being defined by the separated mandibles of the bird's beak;

(j) said rod being connected to the tail of said bird; and,

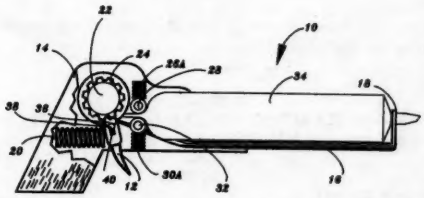
(k) said pivotal plate being connected to said biasing means to bias said gripper into the static position and said tray into its loading position.

4,998,645

APPARATUS FOR DISPENSING THE CONTENTS OF A TUBE

John Pearson, 305 Johnson Dr., Shenandoah, Iowa 51601

Filed Jan. 2, 1990, Ser. No. 460,006
Int. Cl.[5] B65D *35/28*
U.S. Cl. 222—98 **12 Claims**



1. An apparatus for incrementally dispensing material from a tube having an open end and a squeeze end, comprising

a dispensing tool frame,

a take up roller rotatably supported on said frame and adapted for removably receiving the squeeze end of a tube,

a flexible tube support guide operatively associated with said roller whereby rotation of said roller causes said guide to be rolled on to said roller, said tube support guide being retractably supported by a portion of said frame and adapted for removably supporting a tube,

a trigger means coacting with said take up roller such that actuation of said trigger means causes said take up roller to rotate and roll said tube and flexible tube support guide around said take up roller.

4,998,646

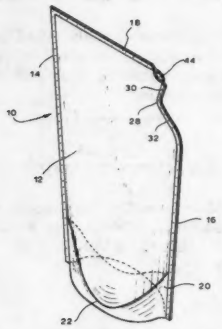
FLEXIBLE POUCH CONTOURED TO FACILITATE POURING

Adam Sherman, Brooklyn, N.Y., assignor to Colgate-Palmolive Co., Piscataway, N.J.

Filed Mar. 23, 1989, Ser. No. 327,844
Int. Cl.[5] B65D *35/08*
U.S. Cl. 222—107 **10 Claims**

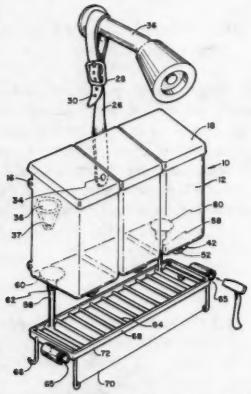
1. A flexible self-standing pouch for storing liquid therein, comprising first and second wall means made of nonrigid sheet material, said first wall means having a first peripheral edge and said second wall means having a second peripheral edge, said first peripheral edge being bonded to said second peripheral edge to form a sealed juncture, said first and second wall means and said sealed juncture defining a closed chamber, said juncture comprising a top portion connected to a first side portion and a second side portion, the top portion juncture being of a length less than the width of the pouch first and second wall means, said first portion in turn comprising an inwardly curved portion spaced from said top portion which defines a recess in said pouch, said recess having a maximum height which is greater than the maximum depth measured in a direction transverse to the direction along which the height is measured, whereby opposing portions of said first and sec-

ond wall means forming a pouch portion suitable for use as a spout when said opposing portions of said wall means are cut



along a line extending from a point along said recess to a point along said top portion.

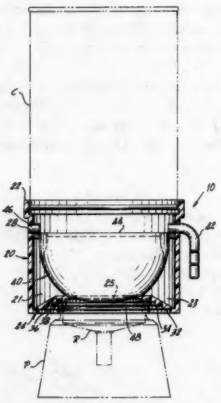
4,998,647
DETACHABLE DISPENSER AND HANGING SUPPORT
Peggy Sharp, Box 1632, Soquel, Calif. 95073
Filed Sep. 8, 1989, Ser. No. 405,681
Int. Cl.[5] B67D *5/60*
U.S. Cl. 222—143 **8 Claims**



1. A multi-unit dispenser and hanging support for use in showers, and bathrooms, comprising:

a plurality of generally rectangular containers, each with a sloped top, a sloped bottom face, a front wall, a back wall, a pair of side walls, said front wall having a lower front wall portion, said back wall having a lower wall portion and an upper wall portion, said containers having a plurality of rails and a plurality of tracks on said lower and upper portion of the back wall so as to detachably secure said containers to one another, each container having a cone shaped filling funnel formed integrally therein, and an outlet opening having a valve means associated with said outlet opening, an adjustable strap with fastening means affixed onto the back wall of the container, and a detachable platform with a plurality of legs each secured at one end to said platform with an upper end having a suction cup affixed thereto for joining said platform to the bottom face of said containers, said platform having a plurality of hooks secured thereto for hanging razors, brushes, and washcloths.

4,998,648
COFFEE DISPENSER
Orlando Contreras, 9301 NW. 36 Ave., Miami, Fla. 33147
Filed Jul. 25, 1989, Ser. No. 384,629
Int. Cl.[5] G01F *11/10*
U.S. Cl. 222—370 **2 Claims**



1. A coffee dispensing device to be used in conjunction with express coffee pots of the type that include a detachable lower portion having an upper open termination to which a coffee reservoir is mounted and housed within said lower portion and said coffee dispensing device is also used in conjunction with cylindrical coffee containers having one open end, comprising:

A. housing means having an upper and a lower end and wherein said upper end is open and has a sufficiently large diameter to cooperatively receive said open end of said coffee container and said lower end of said housing means including a plurality of inwardly converging concentric recesses wherein one of said recesses cooperatively engages with said upper open termination of said lower portion; and

B. coffee dispensing means pivotally mounted within said housing means having substantially a hemispheric shape with concave and convex sides wherein said convex side is positioned over said concentric recesses so that the opening of the smallest of said concentric recesses is covered by and in contact with said convex side and said coffee dispensing means further includes handle means for rotating said coffee dispensing means to unseat said convex side from said concentric recess thereby said coffee reservoir receives said coffee and the excess is shaved off with said coffee dispensing means as it is rotated to return said convex side into contact with said concentric recess.

4,998,649
RETRACTABLE TURNSPOUT CLOSURE
Klaus J. Thanisch, Am Rosenkreuz 6, 5583 Zell/Mosel, Fed. Rep. of Germany
Filed Jul. 27, 1987, Ser. No. 77,909
Int. Cl.[5] B67D *3/00*
U.S. Cl. 222—507 **5 Claims**

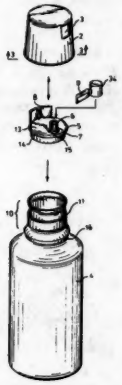
1. A retractable turnspout closure for a container comprising:

a plug base for mounting across a neck of said container, said plug base having an opening offset from its center;

a valve seat mounted on said plug base over said plug base opening;

a retractable and rotatable turnspout having a turret which mounts on said valve seat;

a rotatable cap having an opening in a side wall thereof, a plurality of inwardly projecting members from said side wall, and a boss mounted on and projecting downward from a top of the cap, said boss including means to guidedly engage said retractable and rotatable turnspout and rotate it eccentrically in response to a turning of said cap to a first position wherein said turnspout extends through said opening and a passageway is thus formed from the



container's interior through said valve member and an opening in said turnspout leading to the atmosphere outside the container, and further comprising a shield member mounted on said plug base to abut an end of said turnspout and thus to block said passageway when said turnspout is rotated into a second retracted position, said shield member having an outer surface in sliding contact with the inner surface of the cap whereby, said shield with said cap side wall substantially forms a double seal for said turnspout when said turnpoint is in said second position.

4,998,650

ROTARY NOZZLE ON A MOLTEN STEEL VESSEL

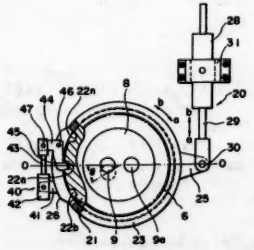
Noboru Yamazaki, Kanagawa, Japan, assignor to Nippon Rotary Nozzle Co., Ltd., Kawasaki; NKK Corporation, Tokyo; Kokan Kikai Kogyo Kabushiki Kaisha, Kawasaki and Tokyo Yogyo Kabushiki Kaisha, Tokyo, all of, Japan

Filed Jul. 17, 1989, Ser. No. 381,120

Claims priority, application Japan, Aug. 12, 1988, 63-200081

Int. Cl.[5] B22D *41/26*

U.S. Cl. 222—599 **10 Claims**



1. A rotary nozzle attached to a bottom of a molten steel vessel comprising:

a rotor having a sliding plate brick mounted thereon, said rotor and said sliding plate brick are rotatable to adjust the degree of opening of a nozzle bore so as to control a pouring rate of molten steel;

engaging means formed on an outer periphery of said rotor; and

rotatable turning means arranged to rotate said rotor, said turning means including detent means for engagement with said engaging means, and locking means to bring said detent means into and out of engagement with said engaging means so that the turning means can both rotate with, and rotate independently from, the rotor, said turning means being connected to an actuator of a hydraulic cylinder attached to said molten steel vessel.

4,998,651

RING NEEDLE PUSHER

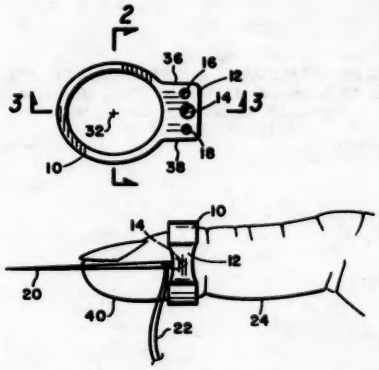
Blue H. Townsend, Bartlesville, Okla., assignor to John D. Gassett and Paul H. Johnson, Tulsa, Okla., part interest to each

Continuation of Ser. No. 271,333, Nov. 9, 1988, which is a continuation of Ser. No. 158,120, Feb. 16, 1988, abandoned, which is a continuation of Ser. No. 36,105, Apr. 8, 1987, abandoned. This application Jan. 10, 1990, Ser. No. 463,159

The portion of the term of this patent subsequent to Feb. 13, 2007, has been disclaimed.

Int. Cl.[5] D05B *91/04*

U.S. Cl. 223—101 **2 Claims**



1. A ring thimble sewing accessory for use in directly pushing a needle comprising:

a ring for wearing on a finger, said ring having a circumference, and a width "w", a front ring plan and a back ring plane and of such size to be located between the end of the finger and the first joint thereof, the size and shape of said ring along the front ring plane being substantially the same as along the back ring plane;

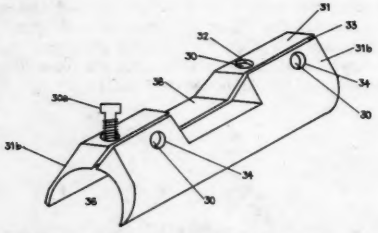
a needle pushing head having a forward face, a rear face, and a top, and made an integral part of said ring, said head extending only along a portion of said circumference and being of no greater width than the width "w" of the rest of the ring, no portion of said needle pushing head extending beyond said front ring plane or beyond said back ring plane, a needle receiving indentation in the forward face of said head, said indentation having an axis substantially perpendicular to said ring plane such that the needle may be pushed in direct contact with said indentation in a direction parallel to said axis.

4,998,652

BICYCLE CLAMP-ON WATER BOTTLE BOSSES

Kirby J. Champagne, 412 Parkside Dr., Lafayette, La. 70501

Filed Oct. 12, 1989, Ser. No. 420,758
Int. Cl.[5] B62J *11/00*
U.S. Cl. 224—39 1 Claim



1. A two piece clamp for attaching at least one water bottle holder to the tubular frame of a bicycle comprising:

first and second members complimentally configured to be joined together at interface surfaces on each member, each member having an arcuate surface defining a contiguous inner arcuate surface, when mounted together, adapted to surround and clampingly receive a tubular member of a bicycle frame, one of said members including at least one flattened outer surface adapted for receiving a water bottle holder, said contiguous surface being discontinuous over a portion opposite said outer flattened surface, said interface surfaces being located adjacent said flattened outer surface and being disposed at an acute angle with respect to said flattened outer surface, and

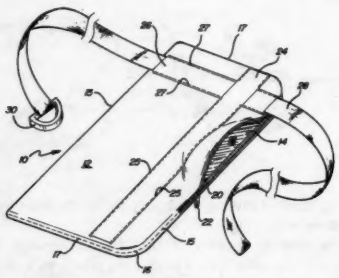
means for securing said first and second members together.

4,998,653

BODY-ATTACHABLE, CONCEALABLE POUCH

Jeanette M. LaBelle, 5514 Woodmire, Utica, Mich. 48087

Filed Jul. 13, 1989, Ser. No. 379,262
Int. Cl.[5] A45C *15/00*
U.S. Cl. 224—151 7 Claims



1. A pouch for holding articles therein, comprising:

opposed front and back sides formed of flexible sheet material and configured as rectangles having opposed long edges and opposed short edges, said rectangles being joined along both short edges, one of the long edges and a portion of the other of the long edges to define a chamber therebetween for receiving said articles therein, and an opening defined by the remaining unjoined portion of said other of the long edges;

means for closing said opening;

only one adjustable, removable belt of flexible material separate from said closing means;

first channel means secured to an outer surface of either of said sides and extending substantially parallel to and proximate said opening defining a first use position wherein said belt is placed in said first channel means so that said pouch can be suspended adjacent said opening when said belt extends either over the wearer's shoulder and diagonally across the wearer's torso or circumferentially around the wearer's body; and

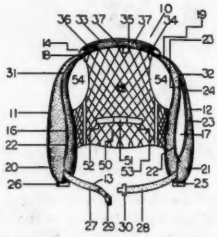
second channel means secured to an outer surface of either of said sides extending generally perpendicularly to said first channel means and proximate one of said short edges defining a second use position, separate from said first use position, wherein said belt is placed in said second channel means so that said pouch can be suspended adjacent said one of the short edges when said belt extends circumferentially around the wearer's body.

4,998,654

ARTICLE CARRIER VEST

Dana Bruzek, 3690 Togo Rd., Wayzata, Minn. 55391, and Jesse L. Colodner, 22 Walter St., Pearl River, N.Y. 10965

Filed May 8, 1989, Ser. No. 349,168
Int. Cl.[5] A45F *3/00;* A41B *3/14;* A41D *1/04*
U.S. Cl. 224—204 2 Claims



1. A shoulder-supported package and article carrier comprising

a carrier vest of unitary construction having dual, substantially L-shaped carrier bags disposed to each side of the wearer's torso;

adjustable vest waist belt attached to the front of said carrier bags;

padded vest collar portion providing neck comfort means wherein said vest collar portion comprises a double-layered member having a rear collar layer and a front collar layer, the width of said rear collar layer extending beyond said front collar layer, said rear collar layer being formed of a moisture absorbent material, said front collar layer being formed of a solid elastic substance covered by cloth material to provide neck comfort means by resilient support of the neck of the wearer, said double-layered member construction providing means for alternative disposition of said vest collar to provide a collared or collarless appearance; and

a flexible vest back portion comprising a cross-hatched array of flexible material.

4,998,655

REUSABLE DISPENSER FOR PACKAGING TAPES, AND COMBINATION DISPENSER AND TAPE ROLL

Harrison Huang, Shenkang Shiang, Taiwan, assignor to Sunclipse, Inc., Montebello, Calif.

Filed Jun. 18, 1987, Ser. No. 64,143
The portion of the term of this patent subsequent to Apr. 17, 2007, has been disclaimed.
Int. Cl.[5] B65D *85/672;* B65H *35/07*
U.S. Cl. 225—26 16 Claims

1. A dispenser for packaging tape, comprising:

(a) wall means to define a chamber sized to loosely receive a roll of packaging tape,

said wall means being formed of synthetic resin, said wall means forming a polyhedron having opposed substan-

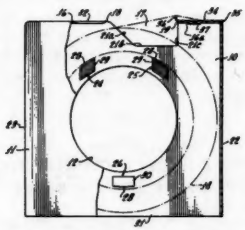
tially parallel sidewalls and having front and rear walls substantially parallel to each other and extending between said sidewalls, said polyhedron also having a top wall, said sidewalls being sufficiently thin to be flexible and elastic,

a portion of said wall means between said

sidewalls having an opening therein, the bottom of said polyhedron being open to provide said opening, said opening being so located and sized that said tape roll may be passed therethrough, in a direction parallel to said sidewalls, to a position in said chamber between said sidewalls,

(b) bearing elements mounted on said opposed sidewalls and extending inwardly therefrom,

said bearing elements being adapted to extend part way into the opening in the core of said tape roll, and to



provide bearing support for said roll as tape is dispensed therefrom,

the amount of said inward extension of said bearing elements being sufficiently small that, when said sidewalls are manually flexed apart, said tape roll may be inserted through said opening into said chamber, said tape roll passing between the inner portions of said bearing elements, said bearing elements penetrating, after said flexed sidewalls resume their unflexed conditions, into the opening in the core of said tape roll,

(c) dispensing opening means in said wall means, through which tape may be dispensed from said roll,

said dispensing opening means being contained in said top wall, and

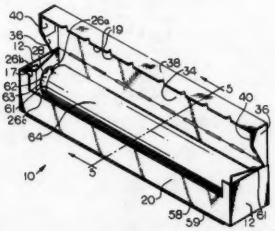
(d) means on said wall means to sever the tape after a length of tape has been dispensed from said roll.

4,998,656

ROLL-RESTRAINING DISPENSING CARTON

Patrick G. Hurh, Geneva, Ill., assignor to DowBrands Inc., Indianapolis, Ind.

Filed Aug. 16, 1989, Ser. No. 394,681
Int. Cl.[5] B26F *3/02*; B65D *85/672*
U.S. Cl. 225—47 **11 Claims**



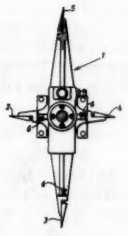
1. A dispensing container for flexible sheet-like materials supplied in roll form, the dispensing container comprising a generally rectangular box, wherein the box has connected by folding lines a back panel, a front panel, first and second side panels, a bottom panel, and a roll restraining means for preventing inadvertent removal of a roll from the dispensing container when sheet-like material is to be drawn therefrom, the box defining front and rear corners, the roll restraining means comprising a retention member adjacent each side panel, the retention members defining collars for a roll having a core, the core having end portions, the collars being retentionally coextensive with and adapted to receive the end portions of the core, the retention members comprising struts and receptacle sides, the receptacle sides being inwardly inclined at an acute angle with respect to the side panels and extending to the rear corners, the struts being positioned outward at generally right angles with respect to the receptacle sides and connecting thereto, the struts having front portions, the front portions of the struts being in general abutment with the front corners.

4,998,657

APPARATUS FOR THE INTERMITTENT FORWARD FEEDING OF A MATERIAL WEB PROVIDED WITH TRANSVERSE CREASE LINES

George Ramsay, King, Canada, and Arne Klint, Vellinge Sweden, assignors to AB Tetra Pak, Lund, Sweden

Filed Sep. 8, 1989, Ser. No. 404,573
Claims priority, application Sweden, Sep. 14, 1988, 8803235
Int. Cl.[5] B65H *23/04*
U.S. Cl. 226—52 **8 Claims**



1. An apparatus for intermittently feeding in a forward direction a material web which has transverse crease lines defining a package length, comprising:

a driving shaft;

a driving wheel mounted on the driving shaft, said driving wheel including four wings that extend radially outwardly with respect to the driving shaft, each of said wings having a free end located distally from the driving shaft, the distance between the free ends of adjacent wings being substantially equal to the distance between two crease lines on the material web, said four wings including two longer wings and two shorter wings, the two longer wings being longer than the two shorter wings, the distance between the free end of at least one of the longer wings and the free ends of the two adjacent shorter wings being substantially equal.

4,998,658

DRILLED UNPORTED VACUUM DRUM WITH A POROUS SLEEVE

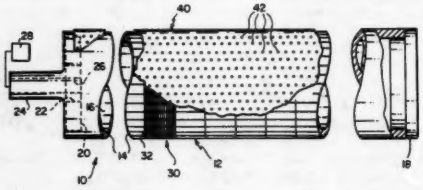
Joseph Distefano, Hilton; Roger Haas, Fairport; Mark Nestle, Spencerport, and Fred D. Kelley, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 27, 1988, Ser. No. 290,208
Int. Cl.[5] B65H *20/12*
U.S. Cl. 226—95 **2 Claims**

1. In an unported vacuum drum for conveying a web, the drum having an outer surface and a hollow interior, means for coupling the drum interior to a vacuum source, a plurality of small grooves in the outer surface of the drum, and a plurality of holes extending between the interior and the outer surface of

the drum with at least some of the holes intersecting the grooves so that vacuum can be applied through the interior and the holes to the grooves to urge a web against the outer surface, the improvement comprising:

a thin cylindrical porous sleeve having an outer surface that is free of grooves over the outer surface of the drum, the porosity of the sleeve being sufficient to enable air to flow through the sleeve into the grooves in the drum so that vacuum in the grooves will attract a web to the sleeve, the porosity of the sleeve resulting from a multiplicity of very small holes substantially exceeding in number the holes in



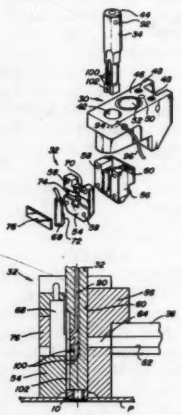
the drum, the holes being sufficiently small to avoid creating discernible marks in a web attracted to the sleeve by vacuum from the drum, the number and size of the holes in the sleeve being related to the number and size of the grooves in the drum so that holes in the sleeve are always aligned with grooves in the drum without regard to the relative positon of the drum and sleeve, whereby a tortuous path is provided for air through the holes in the sleeve, then through the grooves in the drum and into the holes in the drum when vacuum is applied through the holes in the drum.

4,998,659

SELF-ATTACHING FASTENER INSTALLATION HEAD

Dale H. Goodsmith, Brighton, and Harold T. Woods, Livonia, both of Mich., assignors to Multifastener Corporation, Detroit, Mich.

Filed Nov. 16, 1989, Ser. No. 437,247
Int. Cl.[5] B23P *19/00*
U.S. Cl. 227—7 **12 Claims**



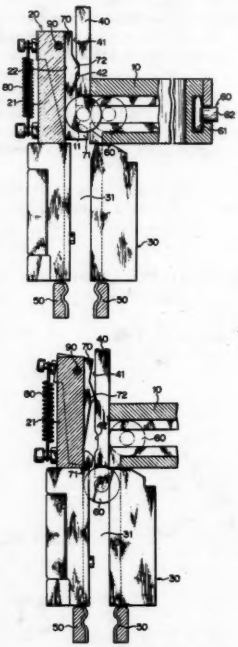
1. An installation head for attaching self-attaching elements to a work-piece, said installation head including a first passage receiving said self-attaching fastening elements, a second passage intersecting and communicating with said first passage, a plunger reciprocating in said second passage through said intersection of said first and second passages, feed means feeding said self-attaching fastening elements through said first passage into said intersection of said first and second passages beneath a free end of said plunger for installation by said plunger through said second passage in said work-piece, sensor means including a sensing element in said second passage opposite said first passage, said sensing means sensing the presence of a self-attaching fastening element in said second passage beneath said plunger free end ready for installation, and cleaning means periodically cleaning said sensing element, said cleaning means including an air passage in said plunger having a generally laterally extending outlet passage spaced from said plunger free end directed toward said sensing element and a source of pneumatic pressure communicating with said plunger air passage, said cleaning means directing a jet of air under pressure through said plunger outlet passage which sweeps across said sensing element as said plunger reciprocates through said intersection of said first and second passages cleaning said sensor element, and said outlet passage comprises a bore extending towards said free end and defining an obtuse angle relative to the reciprocating axis of said plunger toward said sensing element.

4,998,660

APPARATUS FOR DELIVERING BUTTON BODY

Yoshiro Kanzaka, Toyama, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan

Filed Apr. 3, 1990, Ser. No. 503,672
Claims priority, application Japan, Apr. 4, 1989, 1-39672
Int. Cl.[5] A41H *37/04, 37/10*
U.S. Cl. 227—18 **3 Claims**



1. An apparatus for delivering a button body with a hub and a flange placed vertically in relation to a chute at its an outlet guiding said button body fed from said chute to a button feeder of a button applicator by means of a pusher, comprising;

a stopper which is placed facing said outlet of said chute while it is spaced apart said outlet and which contacts said flange of said button body during delivering operation,

a receiving member which is pivotably fixed to the pusher side of the underside of said stopper, which is provided with a receiving projection projecting toward said chute at its button feeder-side fore end and which receives said hub of said button body at its side face,

said pusher which moves backward and forward to a button feed path of said button feeder along a longitudinal space between said receiving member and said outlet of said chute, which pushes said button body with its fore end for feeding said button body to said button applicator and whose fore end forms a pocket together with the inner face of said receiving projection in order to receive said hub of said button body and

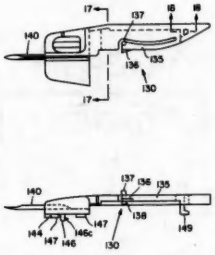
a means for swinging said receiving projection which is provided between said receiving member and said pusher, by which said receiving projection is pivotably moved off said chute with an enough space permitting said button body to pass freely when said pusher begins to move forward and by which said receiving projection is moved in close to said chute when said pusher moves backward.

4,998,661

NEEDLE ASSEMBLY FOR FASTENER DISPENSING APPARATUS

Charles L. Deschenes, North Attleboro; Donald L. Bourque, Millis, and Philip G. Backholm, Northboro, all of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Filed Sep. 15, 1989, Ser. No. 407,630
Int. Cl.[5] B65C *7/00*; A41H *31/00*; A43D *69/00*
U.S. Cl. 227—67 **18 Claims**



1. A needle assembly for dispensing plastic fasteners as part of a tool having a feed track through which a fastener assemblage is fed to a site at which an individual fastener is separated from the assemblage, to be dispensed through the needle assembly,

said needle assembly comprising a needle permanently encased in a holder which may be easily secured to and removed from said tool, said holder defining in conjunction with the remainder of the tool at least a major portion of the feed track, wherein said needle assembly comprises a replaceable part of said tool.

4,998,662

FASTENER-DRIVING AND BATTEN-POSITIONING MACHINE

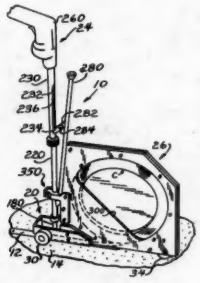
Syed R. Hasan, Palatine, and John R. Beach, Elmhurst, both of Ill., assignors to Illinois Tool Works, Inc., Glenview, Ill.

Filed Mar. 31, 1989, Ser. No. 331,149
Int. Cl.[5] B27F *7/02*
U.S. Cl. 227—111 **18 Claims**

1. A fastener-driving and batten-positioning machine useful for positioning an elongate batten upon a support surface, and for fastening the positioned batten to said support surface by means of a plurality of fasteners at spaced locations along said elongate batten, comprising:

a support base;

a shoe mounted upon said support base and having an undersurface and laterally spaced guides depending downwardly from said undersurface at laterally spaced side portions of said shoe so as to define with said undersurface



an open-ended, downwardly open, elongate channel for longitudinally guiding and laterally confining said batten in position above said support surface to which said batten is to be fastened by said plurality of fasteners; and

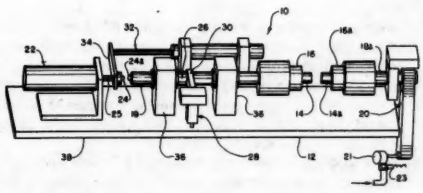
fastener-driving means mounted upon said shoe for driving said fasteners through said batten positioned by said shoe and into said support surface at predetermined locations along said batten.

4,998,663

FRICTION WELDING APPARATUS

Mukerrem Cakmak, and Kenneth Keuchel, both of Monroe Falls, Ohio, assignors to Edison Polymer Innovation Corporation, Cleveland, Ohio

Filed Dec. 22, 1989, Ser. No. 455,520
Int. Cl.[5] B23K *20/12*
U.S. Cl. 228—2 **13 Claims**



1. A friction welding apparatus comprising:

a first, substantially non-rotating shaft axially aligned with a second, rotating shaft;

means for mounting members to be welded together to adjacent, mounting ends of each of said shafts;

means for applying a measured force axial to said shafts;

single-contact-point coupling means for coupling said force-applying means to the non-mounting end of said first shaft;

means for rotating said second shaft; and

means for measuring torque applied to said first shaft;

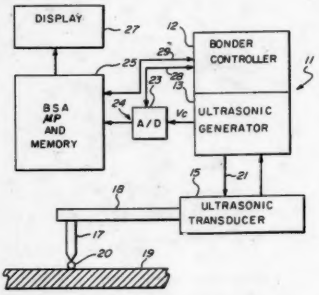
wherein said first shaft can be axially moved by said force-applying means to bring said members together, and said second shaft can be rotated by said rotating means to cause the generation of frictional heat at the contacting surfaces of said members sufficient to fuse said surfaces together.

4,998,664

BOND SIGNATURE ANALYZER

Owen E. Gibson, Arivaca; William J. Gleeson; Larry D. Burkholder, both of Tucson, all of Ariz., and Bradley K. Benton, Carlsbad, Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 22, 1989, Ser. No. 455,706
Int. Cl.[5] B23K 20/10; H01L 21/607
U.S. Cl. 228—102 19 Claims



1. For use with apparatus for forming wirebonds at selected bond sites wherein power is applied to the bond sites during formation of said wirebonds, the improvement comprising:

means for deriving an analog signal representative of the power coupled to the bond site; and

means for sampling said analog signal and determining bond quality from the sampled signal, said sampling means comprising analog-to-digital converter means responsive to a first control signal for sampling said analog signal at a frequency selected by a second control signal to generate a series of digital samples; and digital processor means for supplying said first and second control signals and for receiving and storing said samples;

wherein said apparatus forms a ball bond and wherein said digital processor means includes means for generating a first toggle signal indicative of the beginning of formation of said ball bond, and wherein said analog-to-digital converter means is responsive to said first toggle signal to sample said analog signal during formation of said ball bond;

wherein said apparatus forms a second bond after formation of said ball bond, wherein said digital processor means generates a second toggle signal indicative of the beginning of formation of said second bond, and wherein said analog-to-digital converter means is responsive to said second toggle signal to sample said analog signal during formation of said second bond; and

wherein said apparatus forms a tail and wherein said digital processor means includes means for generating a third toggle signal indicative of the beginning of formation of said tail, and wherein said analog-to-digital converter means is responsive to said third toggle signal to sample said analog signal during formation and tear of said tail.

4,998,665

BONDING STRUCTURE OF SUBSTRATES AND METHOD FOR BONDING SUBSTRATES

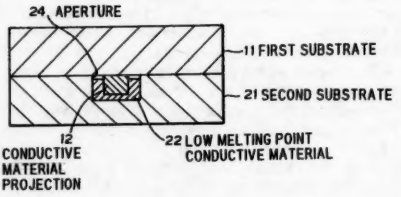
Yoshihiro Hayashi, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Sep. 1, 1989, Ser. No. 401,980
Claims priority, application Japan, Sep. 7, 1988, 63-225226
Int. Cl.[5] H01L 21/50, 21/58; H05K 3/34
U.S. Cl. 228—180.1 4 Claims

1. A bonding structure of first and second substrates, comprising:

a projection of a high melting point conductive material selected from a group consisting of W, Cr, Mo, and TiN provided on one plane of said first substrate; and

a low melting point conductive material selected from a group consisting of Au-Sn, Au-Si, and In-Sn filled in an aperture which is formed on one plane of said second substrate;



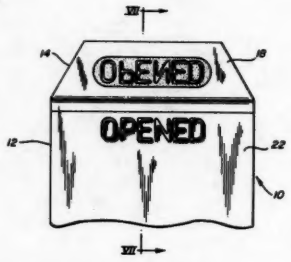
wherein said projection and said low melting point conductive material are connected to each other mechanically and electrically, whereby said first and second substrates come into contact with each other on at least a portion of said one planes.

4,998,666

TAMPER INDICATING CONTAINERS AND SEALS

Frederick R. Ewan, 145 Spinnaker Way, Neptune, N.J. 07753, assignor to Frederick R. Ewan, Neptune and Robert E. Ozimek, Point Pleasant, both of, N.J.

Continuation-in-part of Ser. No. 193,799, May 13, 1988, abandoned. This application Mar. 31, 1989, Ser. No. 334,084
Int. Cl.[5] B65D 55/02
U.S. Cl. 229—102 10 Claims



1. An opaque container comprising:

(a) a body portion and at least one integrated sealable closure flap, said closure flap having an exposed outer surface and a sealable inner surface;

(b) a window portion defined within an area of at least one outer closure flap, said window portion registering with a surface of the container upon closure of said flap;

(c) a translucent or transparent panel having an outer surface and an inner surface and possessing surface dimensions greater than those of said window portion such as to define a perimeter portion extending beyond the edges of the window portion, said panel overlaying said window portion and being affixed across at least a portion of its perimeter to a surface of the closure flap;

(d) a transparent masking material disposed (i) in an indicia-defining pattern (ii) on the inner surface of the translucent or transparent panel opposite the exposed outer surface of said closure flap and (iii) within an area registering with said window portion, said masking material possessing low adhesion properties to the material of said panel;

(e) a colorant layer disposed on the inner surface of the translucent or transparent panel over the transparent masking material and extending beyond the indicia-defining pattern of the masking material; and

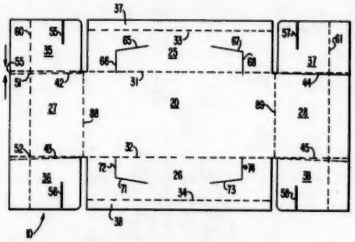
(f) an adhesive disposed over at least the area in which said colorant layer and transparent masking material are disposed, said adhesive being registered with a surface of the container upon closure of said flap and operable upon unsealing of said flap to dislodge said colorant from said panel within the area of the indicia-defining pattern defined by said masking material.

4,998,667

MULTI-CELL CONTAINER

William L. McElhaney; Roger M. Floyd, and Farris N. Duncan, all of West Monroe, La., assignors to Georgia-Pacific Corporation, Atlanta, Ga.

Filed Oct. 19, 1989, Ser. No. 424,173
Int. Cl.[5] B65D *5/48*
U.S. Cl. 229—120.37 10 Claims



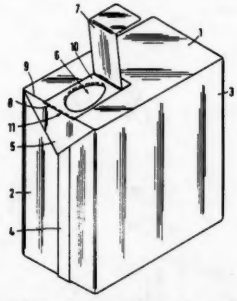
1. A cell unit for use in a multi-cell container, said cell unit comprising a plurality of walls, each wall comprising opposed inner and outer planar surfaces, said walls arranged so as to define a cell having a predetermined volume defined by the inner planar surfaces of said walls, each wall further comprising an upper and a lower flap which are adhesively secured to the outer planar surface thereof.

4,998,668

PACK FOR LIQUIDS

Hans Rausing, Wadhurst, Great Britain, assignor to Tetra Pak International AB, Lund, Sweden

Continuation of Ser. No. 826,066, Feb. 4, 1986, abandoned. This application Jul. 20, 1987, Ser. No. 75,281
Claims priority, application United Kingdom, Feb. 5, 1985, 8502910
Int. Cl.[5] B65D *5/70*
U.S. Cl. 229—123.1 3 Claims



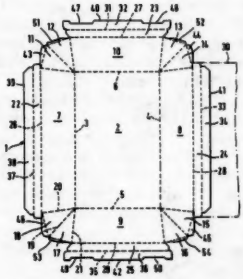
1. A container formed of a cardboard material, which comprises sidewalls, a bottom wall and a top wall, said walls having exterior and interior surfaces, means for joining said walls into a fluid-tight container, an edge in said top wall adjacent to a top wall edge line defining a pouring opening, a single protective strip sealed to said top wall exterior surface and extending beyond said top wall edge line to provide a pouring edge and protection for the entire liquid path flowing along said top wall exterior surface after exiting said pouring opening, said protective strip remaining in the plane of said top wall prior to opening said container, a protective liner for the edge of said pouring opening formed from said protective strip without employing a second strip on the top wall interior surface, and pull tab cover means for the pouring opening engaging with the protective strip.

4,998,669

CONTAINER FOLDED FROM A BLANK

Oskar Karolyi, Bad Boll, Fed. Rep. of Germany, assignor to Michael Horauf Maschinenfabrik GmbH & Co. KG, Donzdorf, Fed. Rep. of Germany

Filed Jul. 31, 1990, Ser. No. 560,178
Claims priority, application Fed. Rep. of Germany, Aug. 17, 1989, 3927187
Int. Cl.[5] B65D *5/24*
U.S. Cl. 229—170 8 Claims



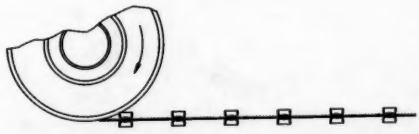
1. A container erected from a sealable cardboard blank, said container comprising a rectangular bottom section and four folded-out side sections, adjacent ones of said side sections being interconnected by a pair of generally triangular corner sections wherein one of said corner sections is connected to one of said adjacent side sections and the other of said corner sections is connected to the other of said adjacent side sections, a border flange extending around a perimeter of said container parallel to said bottom section, said border flange comprising four border strip means joined to respective ones of said side sections, each of said border strip means being of double wall construction and having an outer free edge oriented to face toward an outer surface of a respective side section.

4,998,670

TRACTION MAT

Francis N. Peterson, Box 306, Lake Harmony, Pa. 18624

Filed May 15, 1989, Ser. No. 351,205
Int. Cl.[5] E01B *23/00*
U.S. Cl. 238—14 7 Claims



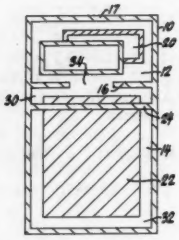
1. A traction mate to obtain traction of an automobile tire on a ground surface of limited friction; said mat comprising a rectangular, flexible, ribbed material which has a plurality of cup shaped cleats that are affixed on both sides of the mat and are riveted together at their bases to form a plurality of cleat pairs; said cleat pairs being affixed in alternating rows of one and two cleat pairs per row and being spaced alternately along a central axis of the mat and equidistant from said central axis.

4,998,671

MULTIPLE COMPARTMENT FLEXIBLE PACKAGE

David H. Leifheit, Cincinnati, Ohio, assignor to The Drackett Company, Cincinnati, Ohio

Filed Oct. 20, 1989, Ser. No. 424,851
Int. Cl.[5] A61L 9/04
U.S. Cl. 239—44 8 Claims



1. A multiple compartment package comprising:

a generally flat outer pouch comprising a pair of peripherally sealed, pliable sheet members, said outer pouch provided with at least one aperture in the surface of at least one of said sheet members;

at least one inner pouch containing a liquid, said inner pouch situated within said outer pouch and adapted to rupture upon the application of pressure through said outer pouch to thereby release its contents into said outer pouch;

an absorbent member interposed between said inner pouch and said aperture, said absorbent member having opposing surfaces sealingly secured transversely to both facing internal surfaces of said outer pouch intermediate said inner pouch and said aperture in a manner such that said absorbent member absorbs substantially all of the contents released from said inner pouch;

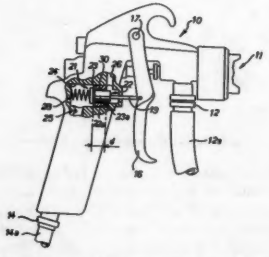
said sheet members being partially transversely sealed together intermediate said inner pouch and said absorbent member and producing along the seal a passageway formed in the area between said sheet members, said passageway adapted to direct the flow of said liquid onto said absorbent member upon the rupture of said inner pouch.

4,998,672

MANUALLY CONTROLLED SPRAYING INSTALLATION AND SPRAYER

Pascal Bordaz, Domene; Laurent Giraud, Le Touvet; Alain Monnier, and Eric Prus, both of Grenoble, all of France, assignors to Sames S.A., Meylan, France

Continuation of Ser. No. 221,047, Jul. 19, 1988, abandoned. This application Apr. 9, 1990, Ser. No. 507,108
Claims priority, application France, Jul. 19, 1988, 87 10213
Int. Cl.[5] B05G 7/12
U.S. Cl. 239—585 14 Claims



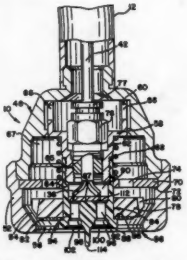
1. Installation for spraying a coating product, including at least one manually controlled pneumatic sprayer, a positionable trigger on said at least one sprayer, variable flow rate means connected to said at least one sprayer, for feeding coating product to be sprayed thereby, a compressed air supply connected to said at least one sprayer for supplying air thereto, means for establishing the flowrate of said compressed air in response to the position of said trigger, a sensor responsive to the flowrate of said compressed air, and control means responsive to said sensor and operatively coupled to said variable flow rate means for causing the rate at which coating product is fed to said at least one sprayer to be substantially proportional to the rate at which said compressed air is supplied thereto.

4,998,673

SPRAY HEAD FOR AUTOMATIC ACTUATION

Joseph J. Pilolla, Elmhurst, Ill., assignor to Sloan Valve Company, Franklin Park, Ill.

Filed Apr. 12, 1988, Ser. No. 180,784
Int. Cl.[5] E03C 1/05
U.S. Cl. 239—67 35 Claims



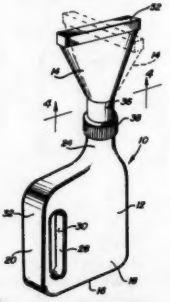
1. A spray head for automatic actuation of flow, said spray head comprising a housing having an inlet and an outlet to receive and direct flow in a predetermined pattern of spray, signal emitting and receiving means connected to said housing for emitting and receiving signals from a zone, said outlet of said housing surrounding said signal emitting and receiving means such that said zone is engulfed by said predetermined pattern of spray upon initiation of flow.

4,998,674

FLUENT GRANULAR MATERIAL DISPENSER AND APPLICATOR

Alessandro Torra, 26 Bixby St., Revere, Mass. 02151

Filed Feb. 16, 1984, Ser. No. 581,112
Int. Cl.[5] A01C 7/02
U.S. Cl. 239—652 4 Claims



1. A dispenser for dispensing and spreading granular fluent material, said dispenser including a hollow, hand-supportable and invertible housing having a closed bottom and upstanding peripheral walls terminating upwardly in a hollow upwardly

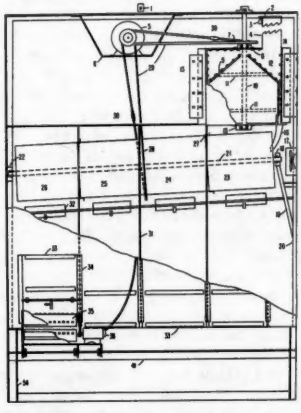
opening outlet neck, an elongated spreading and dispensing nozzle, said nozzle including a first hollow and generally cylindrical inlet end removably telescopingly engaged with said outlet neck for receiving granular material therefrom when said dispenser and nozzle are inverted and a second outlet end remote from said first end, said outlet end being generally rectangular in cross section and said nozzle including longitudinal sidewalls which taper toward the opposite longitudinal sides of said outlet end and diverge toward the opposite ends of said rectangular outlet end, said outlet end of said nozzle including internal laterally spaced transverse wall portions defining a plurality of individual outlet openings therebetween, said housing including means defining a transverse through opening therein relative to which the interior of said housing is sealed and defining a handgrip by which said housing may be comfortably gripped, lifted and inverted, said housing being generally rectangular in horizontal plane and including opposite wide and narrow sidewalls comprising said peripheral walls, said handgrip being disposed along one of said narrow sidewalls, said outlet neck extending outwardly from one end of the other narrow sidewall of said housing, the inlet end of said nozzle and said neck including mounting means operative to selectively support said nozzle from said neck in 90° relatively rotated positions thereon with the longitudinal extend of said nozzle outlet end disposed transverse to and paralleling the major transverse dimension of said housing.

4,998,675

SOLID WASTE PROCESSING UNIT

John H. Mohrman, Willow St., P.O. Box 280, Middleport, Pa. 17953

Filed Nov. 29, 1989, Ser. No. 443,007
Int. Cl.[5] B02C *25/00*
U.S. Cl. 241—36 **8 Claims**



1. A solid waste processing unit for receiving unedible solid waste stream items comprising in combination:

a waste disintegrator, said disintegrator having a depository opening at the top and a discharge tube at the bottom, a stationary circular chamber and a rotating top cone-shaped drum mounted within said chamber, both equipped with elliptical-patterned cutting heads, wherein above waste entering at the top gravitates downward first between the cone-shaped rotating drum and the stationary circular chamber and being crushed, torn and shredded to smaller size enters the vertical area between said drum and chamber whereby the aforesaid process is continued as waste enters the discharge tube;

said rotating drum mounted on a shaft held in place by bearings and propelled by a V-belt flange mounted on the shaft top end powered by an electric motor;

electrical switch means associated with said waste disintegrator to activate the processing unit and allow the lid on a depository opening to be released to receive waste;

a multi-dimensioned rotating screening cylinder mounted on a pipe shaft in a slanted position with each shaft end in bearings and driven by a V-belt shaped hoop also powered by the electric motor powering the disintegrator described hereinabove;

said screening cylinder receiving disintegrated waste via the waste disintegrator discharge tube into the higher end of the cylinder thereby in process sorting particles and pieces of waste by size and weight, said screening cylinder being in fluid communication with an air blowing fan positioned near the entry end of said screening cylinder for expediting the waste sorting process;

compartmented bins below the screening cylinder receiving and storing the disintegrated and screen-sorted particles and pieces of waste, each bin containing a slanted bottom allowing said waste to be removed from the bin through a bin door;

said compartmented bins having a means of shutting off electric power to the entire unit if any bin becomes completely filled with waste;

a bin traversing compactor assembly equipped with rollers and powered by a drive motor to compact and feed hereinabove said screen-sorted particles and pieces of waste out of said compartmented bins into such form to allow removal;

switch control means that prevents activation of the compactor drive motor if said compactor assembly is not properly connected to a compartmented bin opening; switch control means on the compactor assembly to deactivate said compactor drive motor when a compartmented bin is empty;

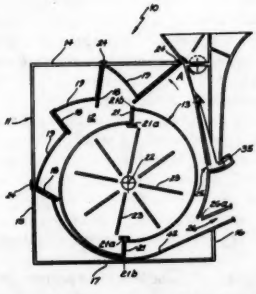
a single double walled container housing all components hereinabove.

4,998,676

MILL

Graziano Sirol, Lot 31, Galvin Road, Llandilo, New South Wales 2760, Australia

PCT No. PCT/AU88/00028, § 371 Date Jun. 28, 1989, § 102(e) Date Jun. 28, 1989, PCT Pub. No. WO88/05340, PCT Pub. Date Jul. 28, 1988
PCT Filed Jan. 15, 1988, Ser. No. 391,577
Claims priority, application Australia, Jan. 15, 1987, PH9882; Feb. 26, 1987, PI0549
Int. Cl.[5] B02C *13/286*
U.S. Cl. 241—55 **9 Claims**



1. A mill comprising a substantially cylindrical housing having a rotor mounted therein, said housing having an inlet and an outlet and having a transverse cross-sectional interior contour with a plurality of planar surfaces generally in a radial

direction away from the longitudinal axis of said housing, and with arcuate surfaces joining the outer edge of one planar surface to the inner edge of the adjacent planar surface to form a plurality of impacting chambers around the periphery of the housing, said rotor having at least two cam surfaces, the outer edges of which are substantially adjacent the inner surface of the housing at its closest point, wherein the ore which is to be milled is inserted through the inlet into the housing where it is impacted by the rotating cam surfaces and forced onto said planar surfaces by the force of the moving cam surface, wherein the ore is broken up in stages by the plurality of impacting chambers and is then forced through an outlet chamber having a collecting tray where the heavier particles are collected in the collecting tray whilst the lighter particles are exhausted, wherein an outlet passage between said impacting chamber and said outlet chamber in combination with centrifugal force caused by the rotor movement prevents the broken up ore in said outlet chamber from re-entering said impacting chamber.

4,998,677

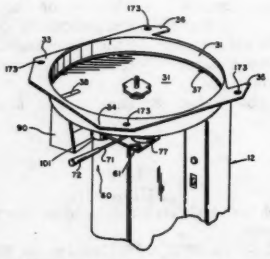
MACHINE FOR SHAVING ICE

Harold D. Gallaher, Wallen Rd., Bismarck, Mo. 63624

Continuation of Ser. No. 375,920, Jul. 6, 1989, abandoned, which is a continuation of Ser. No. 180,902, Apr. 13, 1988, abandoned. This application Nov. 30, 1989, Ser. No. 442,468

Int. Cl.[5] B02C *18/00*

U.S. Cl. 241—95 **4 Claims**



1. An ice shaving machine, comprising:

a receptacle for holding a quantity of ice to be shaved, said receptacle having a bottom with an elongate slot therethrough;

an adjustable blade extending into said slot for contacting the ice to shave pieces off the ice, said adjustable blade including adjustable mounting means for adjusting the depth of penetration of the blade into the slot and also for adjusting the angle of tilt of the blade across the slot;

said adjustable mounting means including an elongate, generally rectangularly shaped blade mounting plate having a longitudinal axis and supported for pivoting movement on the bottom of said receptacle about an axis transverse to the longitudinal axis of the plate;

said blade being mounted on one end of said plate;

movable means being engaged with the other end of the plate for causing pivoting movement of the plate about the transverse axis to vary the depth of penetration of the blade in said slot;

said movable means comprising a lever pivoted at one end to the plate and extending to a handle at its other end in front of the machine; and

a roller being carried by the lever in a position to engage the bottom of the receptacle, so that movement of the lever changes the position of the roller relative to the transverse axis and thereby causes rocking movement of the plate about said transverse axis.

4,998,678

AGITATOR BALL MILL

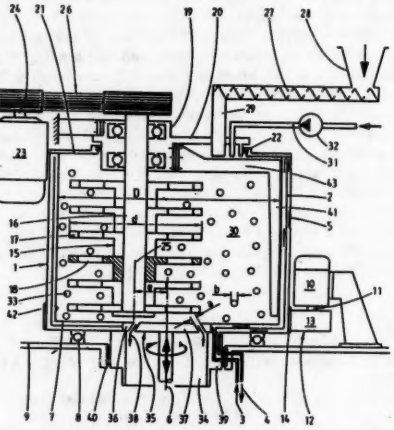
Herbert Dürr, Buchen, Fed. Rep. of Germany, assignor to Walter Eirich; Paul Eirich and Hubert Eirich

Filed Nov. 17, 1989, Ser. No. 437,704

Claims priority, application Fed. Rep. of Germany, Nov. 18, 1988, 3838981

Int. Cl.[5] B02C *17/16*

U.S. Cl. 241—171 **36 Claims**



1. Agitator ball mill comprising a grinding container (1) having a cylindrical grinding chamber (30) which is defined by a grinding-chamber wall (42), and a central longitudinal axis (6) and at least one agitator (15, 104) which is arranged in said grinding chamber (30) and is provided with projecting agitating tools (17, 106) and has an agitator axis (25, 108) which extends parallel with the central longitudinal axis (6) of the grinding chamber (30), wherein the agitator (15, 104) and the grinding container (1), can be rotationally driven about their respective axes (25, 108; 6) by means of a drive,

wherein the grinding chamber (30) is partially filled with auxiliary grinding bodies (33) which are fairly freely movable in a mixture of grinding stock and auxiliary grinding bodies, and wherein the grinding chamber (30) is provided with a grinding-stock feed means (29, 52, 60, 80, 83, 93) and a grinding stock discharge means comprising a separating device (35, 53, 61, 88, 98) for separating grinding-stock and auxiliary-grinding-bodies from each other,

wherein the agitator axis (25, 108) has an eccentricity (e, e') relative to the central longitudinal axis (6) of the grinding chamber (30), and wherein, in the region of the grinding-chamber wall (42), at least one stationary deflector (41) is provided which is directed from the grinding-chamber wall (42) into the grinding chamber (30) and which extends across a substantial portion of the length of the grinding chamber (30) in the direction of its central longitudinal axis (6) and which has a deflecting face (44) which is open in the direction of the central longitudinal axis (6), and

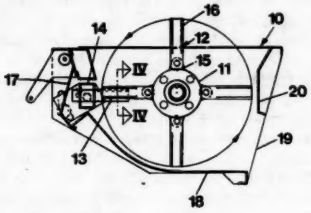
wherein the deflector (41) is arranged in the region of transition to a contracted cross-sectional region (49) of the grinding chamber (30), the agitator axis (25) being arranged in the contracted cross-section (49) and the latter being defined by a plane disposed through the central longitudinal axis (6), which plane is disposed to be normal to a plane which is set through central longitudinal axis (6) and the agitator axis (25).

4,998,679

DEVICE FOR CHOPPING STRAW

Arne Bender, Assarsgården, Larv, S-535 00 Kvänum, Sweden

Continuation-in-part of Ser. No. 71,793, Jun. 10, 1987, abandoned. This application Oct. 28, 1988, Ser. No. 264,319
Claims priority, application Sweden, Sep. 30, 1985, 8504508
Int. Cl.[5] B02C *18/18*
U.S. Cl. 241—243 5 Claims



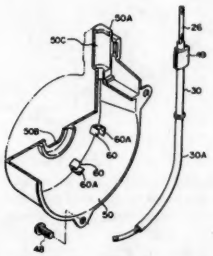
1. A device for chopping straw comprising:
an apparatus housing;
a rotor mounted for rotation about a longitudinal axis thereof in said apparatus housing;
said apparatus housing including opening means defining a straw inlet generally transversally towards said rotor and opening means defining a chopped straw outlet generally transversally outwards from said rotor at a site located partway circumferentially about said rotor from said straw inlet;
said apparatus housing including wall means arranged for preventing ingress of air into said housing except through said straw inlet;
a plurality of pairs of elongated knife arms, each pair being detachably mounted to said rotor so as to project generally radially therefrom, each said knife arm being generally planar and disposed to radiate from said rotor substantially transversally to said longitudinal axis;
a longitudinally extending knife beam mounted on and disposed in said apparatus housing spacedly beside said rotor radially beyond said knife arms;
a plurality of elongated counter-knives mounted in a longitudinally extending row to said knife beam so as to project therefrom towards said rotor, each said counter-knife being generally planar and disposed to project from said knife beam substantially transversally to said longitudinal axis;
said knife arms and counter-knives comprising flat bars each having two axially oppositely-facing side surfaces, and two laterally opposite long edges extending lengthwise of the respective side surfaces;
said knife arms and counter-knives being arranged so that most of them interdigitate throughout substantial portions thereof as said rotor rotates, whereby radially outer portions of most of the knife arms, upon each revolution of the rotor, pass between free end portions of a respective two of said counter-knives, so that, as said rotor rotates in one direction about said longitudinal axis, each said knife arm presents one said long edge thereof as a leading edge and another said long edge thereof as a trailing edge relative to one said long edge of said counter-knives which constitute respective leading edges of said counter-knives;
said counter-knives being arranged upstream of said chopped straw outlet, between said straw inlet and said chopped straw outlet in relation to said one direction of rotation of said rotor;
said knife arms being arranged to act as fan blades guiding the air stream with chopped straw exiting from said chopped straw outlet, by the fact that each said knife arm having said leading edge thereof in said radially outer portion thereof bevelled in a respective oblique sharpening plane which extends substantially throughout the thickness of the respective knife arm;
at which the detachable knife arms being arrangeable with their sharpening planes in different configurations with respect to each other in order to provide a desired spreading direction and spreading width of the chopped straw behind said outlet;
in each said knife arms, said oblique sharpening planes facing in the same direction, so that by turning the knife arm 180° and thereby making its former trailing edge its leading edge, its directional effect on the air stream with chopped straw is changed.

4,998,680

WEBBING DRIVE APPARATUS FOR A SEAT BELT SYSTEM

Toshimasa Yamamoto, Aichi, Japan, assignor to Kabushiki Kaisha Toaki-Rika-Denki-Seisakusho, Aichi, Japan

Filed Oct. 18, 1989, Ser. No. 423,332
Claims priority, application Japan, Oct. 18, 1988, 63-135774[U]; Oct. 18, 1988, 63-140881[U]
Int. Cl.[5] B60R *22/34, 21/10*
U.S. Cl. 242—54 R 20 Claims



1. A webbing drive apparatus for a seat belt system used to drive a webbing to be worn by a seat occupant of a vehicle so as to fasten the webbing around the occupant or cancel the application thereof, comprising:
a wire for retaining said webbing;
a drum assembly for taking up or reeling out said wire during rotation of said drum assembly so as to drive said webbing by said wire;
a cover for covering said drum assembly, said cover including a top plate with a depending side wall and a projection with an opening through which said wire movably passes;
guide means for guiding an intermediate portion of said wire that is slidably disposed to pass therethrough in a predetermined direction of movement of said wire, said guide means including a cylindrical member disposed adjacent to said opening of said cover; and
clamping means positioned adjacent said opening of said projection between said cylindrical member of said guide means and said projection, said clamping means comprising a clamp provided on one of said projection and said cylindrical member and a bracket provided on the other of said projection and said cylindrical member, said clamp and said bracket being securely engaged by clamping said bracket with at least a tip portion of said clamp.

4,998,681

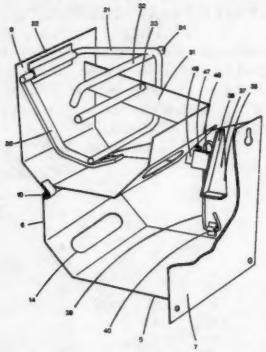
DISPENSER FOR TOILET ROLLS

John D. McNeill, 14 Simla Avenue, Havelock North, New Zealand

Filed Jul. 17, 1989, Ser. No. 380,896
Claims priority, application New Zealand, Jul. 20, 1988, 225496; Nov. 24, 1988, 227076
Int. Cl.[5] B65H *19/00*
U.S. Cl. 242—55.53 5 Claims

1. A toilet roll dispenser for dispensing toilet paper from a toilet roll comprising a casing having a loading compartment

and a dispensing compartment, said loading compartment including a lid member openable to enable a toilet roll to be loaded into the loading compartment and including locking means to prevent the lid member from being opened while a toilet roll is present in the loading compartment, said locking means having a roll support member and an auxiliary roll support member which are moveable to a juxtaposed position to receive the toilet roll and which move to a separated condition when no toilet roll is present in the loading compartment, said auxiliary roll support member having a spigot which



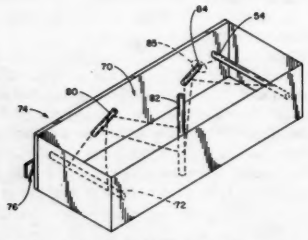
engages a stop member to prevent the lid member from being opened when the roll support member and the auxiliary roll support member are juxtaposed, said dispensing compartment being provided with a dispensing mechanism, said dispensing mechanism being moveable to a first position to receive a toilet roll from the loading compartment and moveable to a second position to enable paper to be dispensed from the toilet roll, and said dispensing mechanism being adapted so as to prevent removal of the toilet roll from the dispenser compartment until substantially all of the paper has been dispensed from the roll.

4,998,682

PAPER TAPE WINDING AND INVERTING DEVICE

Stephen W. Malone, 707 Tee Cir., New Smyrna Beach, Fla. 32069

Filed Sep. 26, 1989, Ser. No. 412,345
Int. Cl.[5] B65H *18/04*
U.S. Cl. 242—67.10 R **1 Claim**



1. A device for winding and inverting paper tape used on an adding machine-type office machine comprising:

a container having a bottom wall forming a bottom of said container, two side walls each having a top edge spaced from said bottom, a proximal end wall having a top edge, a distal end wall having a top edge, each of said wall top edges being spaced from said bottom wall and cooperating with each other to define a top for said container, a cover extending over said top, an accordion-folded section in said cover adjacent to said distal end wall top edge, said cover having a front edge and moving between an open position with said cover front edge spaced from said side wall top edges to a closed position with said cover front edge engaged against said side wall top edges when said accordion-folded section is collapsed and extended respectively;

suction cup attaching means on said proximal end for releasably mounting said container onto an adding machine-type office machine;

a paper winding and inverting mechanism mounted in said container and comprising a proximal roller unit extending across said container and being rotatably mounted on said container side walls near said proximal end wall, a distal roller unit extending across said container and being rotatably mounted on said container side walls near said distal end wall, said proximal and distal roller units being oriented in space relation to said bottom wall and being coplanar with each other, crescent-shaped cutouts defined in said side walls rotatably mounting said proximal and distal roller units on said side walls, said distal roller unit including a handle mounted thereon and located adjacent to one of said side walls for manually operating said distal roller unit, a first inverting roller mounted on a second side wall near said proximal roller unit and extending from said second side wall toward said container top at a 45° angle with respect to said proximal roller unit, a second inverting roller unit mounted on said bottom wall near said first inverting roller and extending at a 90° angle with respect to said proximal roller unit and being oriented vertically upward from said bottom wall, a third inverting roller unit mounted on said second side wall near said second inverting roller unit and extending from said second side wall toward said second side wall top edge at a 45° angle with respect to said second roller unit and with respect to said distal roller unit and with respect to said second side wall, said first inverting roller being located between said proximal roller unit and said second inverting roller unit, said second inverting roller unit being located between said first inverting roller and said third inverting roller unit and said third inverting roller unit being located between said second inverting roller unit and said distal roller unit, said first roller being coplanar with said third roller unit;

said proximal roller unit, said second roller unit, said third roller unit and said distal roller unit each including two roller elements located with respect to each other to define a pinch opening through which paper moves;

a paper quiding roller mounted on said cover front edge and being spaced from said cover front edge to define a paper-guiding slot with said front edge; and

a latch means on said container one side wall for releasably coupling said cover to said container one side wall, said latch means including a hook pivotally attahced to said one side wall, and a projection mounted on said cover near side cover front edge.

4,998,683

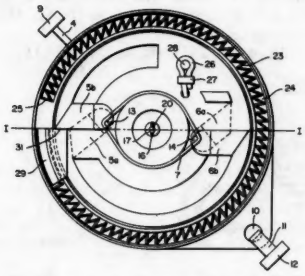
SPOOL AND CORD TYPE SAFETY DEVICE

Hans Wendelborn, Luttkoppel 9 D-2361, Leezen, Fed. Rep. of Germany

Filed Aug. 10, 1989, Ser. No. 392,279
Int. Cl.[5] A62B *1/08*; B65H *95/48*
U.S. Cl. 242—99 **6 Claims**

1. A spool and cord type arresting device comprising a casing, a spool rotationally mounted in the casing, a cord wound on the spool for paying out from the casing thereby rotating the spool, at least one pawl pivotally mounted on the spool for outward pivoting movement under centrifugal force responsive to rotation of the spool, the pawl having an outer extended position to which it is moved when the spool attains a critical speed of rotation, a track in the casing at least partly surrounding the spool, a slider mounted for travel around the track, and a compressible buffer element in the track for en-

gagement by the slider, the pawl being positioned for engaging the slider in said extended position and moving the slider



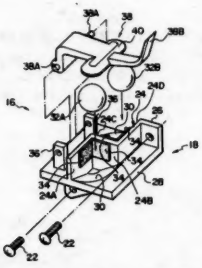
around the track so as to compress the buffer element and arrest the spool.

4,998,684

ACCELERATION SENSOR FOR A RETRACTABLE SEAT BELT

Shinji Mori, Niwa, Japan, assignor to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho, Aichi, Japan

Filed Apr. 10, 1989, Ser. No. 335,491
Claims priority, application Japan, Apr. 15, 1988, 63-92727
Int. Cl.[5] B60R *22/40*
U.S. Cl. 242—107.40 A **15 Claims**



1. An acceleration sensor for a retractable seat belt capable of moving a movable member by displacement of a mass body due to an acceleration caused when an acceleration is applied in any of a plurality of directions in a horizontal direction, said acceleration sensor comprising:

a bracket, said bracket further comprising a base body and a partition wall disposed vertically from said base body;

a plurality of mass bodies movably disposed on said bracket, said partition wall being between said mass bodies such that displacement of each of said mass bodies is restricted by said partition wall in at least one direction; and

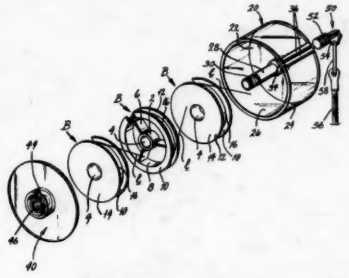
a movable member which can be moved due to the displacement of said mass bodies, wherein said movable member is in contact with said mass bodies when horizontal acceleration is less than a predetermined level and said movable member is operated by the displacement of said mass bodies when horizontal acceleration exceeds the predetermined level so as to lock the retractable seat belt and prevent withdrawal of the seat belt.

4,998,685

CONTAINER FOR HOLDING SPOOLS OF THIN LINE

Donald R. Spencer, Rte. 1, Box 181, Grafton, Ill. 62037

Filed Dec. 5, 1988, Ser. No. 279,832
Int. Cl.[5] B65H *49/18*; B65D *85/00*
U.S. Cl. 242—137 **20 Claims**



1. A container for holding a plurality of spools, each having a line wound around it, said container comprising: a housing having a flexible peripheral wall which surrounds a cavity and an end wall which extends across one end of the cavity and is connected to the peripheral wall at one end of the peripheral wall, the cavity being configured to hold the plurality of spools arranged coaxially, the peripheral wall having a free edge remote from the end wall and further having a slit extending between end wall and the free edge, the slit being provided with edges; elastomeric liners located along the edges of the slit where they are fitted to the peripheral wall, both the liners and peripheral wall being flexible enough to grip and hold lines extended through the slit, the liners being tubes which are slit axially for their full lengths to receive the edges along the slit; an end plate connected to the housing and extending crosswise at the opposite end of the cavity so as to prevent spools from coming out of the end of the cavity at which it is located; and restraining means for urging the end plate toward the end wall of the cavity so as to exert a light clamping force in the spools arranged coaxially in the cavity between the end plate and end wall and thereby retard rotation of the spools within the cavity.

4,998,686

MECHANICAL STRUCTURE FOR VIDEO TAPE REWINDER

Long-Jing Lin, No. 53, Yih Yeong Road, 80257 Lin Yu Dist, Kaohsiung City, Taiwan

Filed Oct. 19, 1989, Ser. No. 423,379
The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.
Int. Cl.[5] G03B *1/04*; G11B *15/32*
U.S. Cl. 242—186 **5 Claims**

1. A tape cassette rewinder, comprising:

(A) a casing for receiving a tape cassette in an open position;

(B) a movable support member pivotably mounted on the casing for movement about a pivot axis between a rewinding position and a rewind-stop position;

(C) drive means mounted on the support member for rewinding the tape cassette in the rewinding position, and for angularly moving the support member about the pivot axis to the rewind-stop position to open the casing when the rewinding is completed, said drive means including

(i) a rotary main winding head engageable with the tape cassette and rotatable about a main axis,

(ii) an electrically powered motor having an output shaft rotatable about a shaft axis, and

(iii) a gear transmission between the shaft and the head for rotating the head about the main axis, said transmission including

(a) a motor gear mounted on the shaft and rotatable about the shaft axis,
(b) a first gear in meshing engagement with the motor gear and rotatable about a first gear axis,
(c) a double gear having a second gear in meshing engagement with the first gear, and a third gear rotatable jointly with the second gear about a second gear axis,

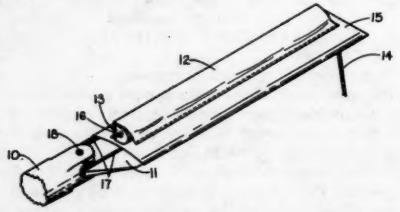
(d) a fourth gear mounted on the head and rotatable about the main axis, and
(e) said main axis, shaft axis, first gear axis and second gear axis being mutually parallel;
(D) a motor housing mounted on the support member for receiving the motor; and
(E) means on the housing for securely holding the motor in place within the housing.

4,998,687

REMOVABLE LIFT SPOILER FOR PARKED AIRCRAFT

John M. Gorman, 5903 Fisher Ave., Ft. Hood, Tex. 76544

Filed Sep. 5, 1989, Ser. No. 402,543
Int. Cl.[5] B64C *3/58*
U.S. Cl. 244—100 R 3 Claims



1. A device for spoiling the lift generating capacity of parked aircraft airfoils, comprising a removable airfoil projection cover, an aircell chamber, both being constructed of sheet material, and an inflatable airfoil spoiler that is rouund in shape to afford smooth effective spoiling when overpresurrized and maintain its designed shape in high wind wherein said chamber is of a strong light-weight fabric sheet material that is permanently attached longitudinally to the top of said cover to house and protect the inflatable airfoil spoiler aircell.

4,998,688

OPERATING TEMPERATURE HYBRIDIZING FOR FOCAL PLANE ARRAYS

Ernest P. Longerich, Chatsworth, and Saverio A. D'Agostino, Camarillo, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jun. 29, 1989, Ser. No. 373,117
Int. Cl.[5] F42B *15/01*; H01H *71/18*
U.S. Cl. 244—3.16 27 Claims

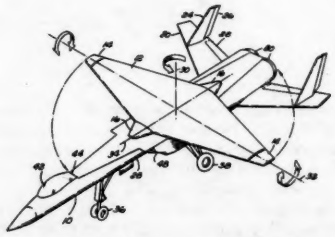
1. Apparatus for controlling the contact closures of respective arrays of opposing contact pairs comprising:
a first array of contact elements positioned along a first planar member;
a second array of contact elements extending along a second planar member in opposing juxtaposition respectively aligned with the contact elements of the first array; and
means including a shape memory element for closing the respectively aligned contact pairs for temperatures in a range on one side of a selected transition temperature in a range on the other side of said selected transition temperature, said means including biasing spring means operative in conjunction with said shape memory element to provide a net biasing force in a first direction for temperatures below said transition temperature and a net biasing force in a second direction opposite to the first direction for temperatures above said selected transition temperature.

4,998,689

90 DEGREE ROTATION AIRCRAFT WING

Robert R. Woodcock, Sylmar, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Jul. 14, 1989, Ser. No. 380,065
Int. Cl.[5] B64C *3/38*
U.S. Cl. 244—46 21 Claims



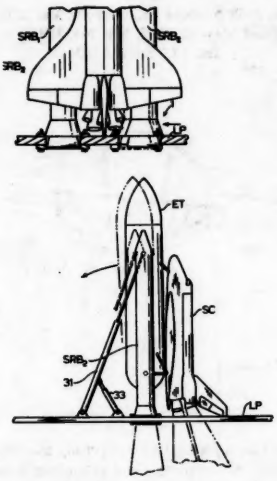
1. An aircraft designed to operate effectively at both moderate and supersonic velocities comprising:
a fuselage having attitude stabilizer pitch and yaw control means;
a unitary wing having roll control means;
turret means coupling said wing to said fuselage through bearing means,
said turret means comprising a shell coupled to said wing, said shell being rotatable on said bearing means, and
actuator means connected to said shell and capable of driving said wing to positions parallel or perpendicular to said fuselage for normal operations.

4,998,690

SRB AND EXTERNAL TANK STABILIZING SYSTEM

Walter Wustefeld, 15 Kersey Crescent, Richmond Hill, Ontario, Canada L4C 3W2

Filed Jan. 20, 1988, Ser. No. 145,919
Int. Cl.[5] B64G *1/40, 1/14, 1/22, 1/00*
U.S. Cl. 244—158 R 10 Claims



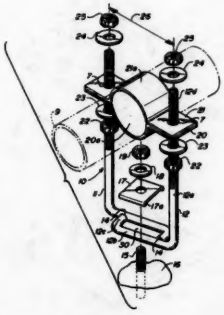
1. An improvement in a solid rocket booster and external tank launch pad mounting system for a space shuttle craft having an external tank with inside and outside solid rocket boosters to either side of the external tank and wherein the external tank experiences cryogenic shrinkage when filled with fuel, the improvement comprising slideable rocket booster support means for allowing such cryogenic shrinkage without affecting preset upright positioning of the outside solid rocket booster.

4,998,691

U-SHAPED PIPE CLAMPING SYSTEM

David P. Brown, Salt Lake City, Utah, assignor to Baker Hughes Incorporated, Houston, Tex.

Filed Jan. 23, 1990, Ser. No. 468,552
Int. Cl.[5] F16L *3/08*
U.S. Cl. 248—74.1 12 Claims



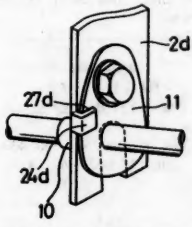
1. A piping support comprising:
a first generally L-shaped rod member having a first elongated threaded stem extending from a first integral base member;
a second generally L-shaped rod member substantially identical to said first rod member and having a second elongated threaded stem integrally extending from a second base member;
said base members being juxtaposed in a base plane with respect to said stems and wherein an opening is formed between said base members and wherein said stems extend in spaced relationship;
means for adjustably spacing said threaded stems and for joining said rod members at their base members to accommodate pipes of different diameters;
base clamp means contacting said base members for connecting said joined members to a fixed post extending through said opening; and
pipe clamp means positioned on and across said stems and displaced in a spaced plane above said base plane for clamping and spacially holding a pipe extending between said stems.

4,998,692

HOSE FITTING FIXING CONSTRUCTION

Terumitsu Shigeki, Nagoya, and Satoshi Mizutani, Kuwana, both of Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed Jan. 27, 1989, Ser. No. 302,266
Claims priority, application Japan, Feb. 10, 1988, 63-29684; Apr. 4, 1988, 63-45371
Int. Cl.[5] F16L *3/00*
U.S. Cl. 248—56 14 Claims



1. A hose fitting fixing construction comprising:
a hose fitting comprising a tubular sleeve into which a hose is inserted and a plate flange into which a hose is inserted and a plate flange extending from an outer peripheral surface of said sleeve in a radial direction of said sleeve;
a plate bracket extending from a mounting portion; and
a fixing means for fixing said flange and said bracket in an overlapped state, said fixing means being separate from said tubular sleeve and hose; wherein
said bracket has at least one stopper having a first stopper surface in contact with said hose fitting and being substantially parallel to a plane which contains a fixing point of said fixing means and a central axis of said sleeve of said hose fitting for preventing said hose fitting from moving on a surface of said bracket.

4,998,693

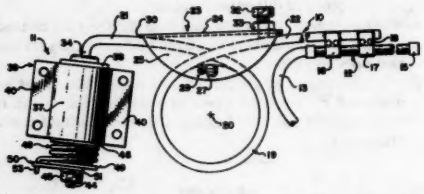
SUPPLY HOSE SUPPORT ARRANGEMENT FOR CAR WASH

Jacob R. Wiebe, 60 Heaton Avenue, Winnipeg, Manitoba, Canada R3B 3E3

Filed Mar. 20, 1989, Ser. No. 326,005
Int. Cl.[5] B05B *15/08*
U.S. Cl. 248—75 22 Claims

1. A boom for a supply hose of a car wash comprising a support hub member including bearing means for defining a vertical rotation axis for the boom, an integral spring wire having an inner end mounted on said support hub member for

rotation about the vertical axis and an outer end portion extending outwardly from the hub member in a substantially horizontal direction for rotation in a substantially horizontal plane, hose support means attached to the outer portion of the spring wire so as to support said supply hose outwardly of the support hub member for rotation with the spring wire about said vertical axis, said spring wire including at least one loop therein rotated through at least 360° arranged such that the wire can bend in a vertical bending plane down from the horizontal plane about an axis defined by the loop, said loop lying substantially in the vertical bending plane of the wire



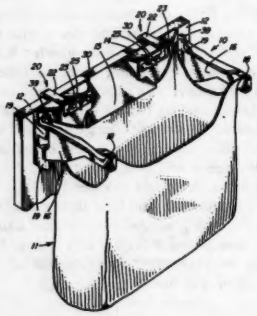
whereby bending of the wire in the vertical bending plane causes torsioning of the loop, said loop being contiguously connected with an inner tangentially extending portion extending from said loop to said inner end and an outer tangentially extending portion extending from said loop to said outer portion, said loop being formed such that in a relaxed condition of the loop the outer end portion extends upwardly from the horizontal plane, and a leveller device for restraining the outer portion against upward movement comprising a member mounted on the spring wire at the loop arranged to engage upper edges of the inner and outer tangentially extending portions and the loop.

4,998,694

BAG HOLDER

Peter C. Barteaux, 803 - 1127 Barclay Street, Vancouver, B.C. V6E 4C6, Canada

Filed Nov. 9, 1989, Ser. No. 433,840
Int. Cl.[5] B65B *67/04*
U.S. Cl. 248—100 **21 Claims**



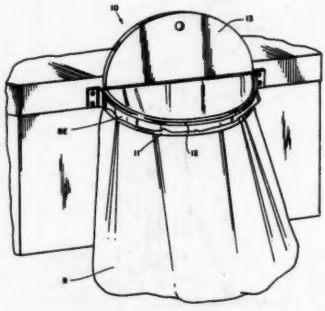
1. A bag holder comprising;
(a) a support frame having a first side and a second side;
(b) adjustable mounting means connectable to said support frame for removably mounting said first side of said support frame on a support surface, wherein said mounting means is movable between a plurality of mounting positions extending generally perpendicular to said support frame first side, and a retracted position substantially co-planar with said support frame first side; and
(c) a pair of swing arms pivotally connectable on opposed ends of said support frame, wherein said swing arms are movable between a collapsed position whereat they lie in a plane approximately parallel to said second side of said support frame and an operative position whereat they extend in a plane approximately perpendicular to said second side of said support frame.

4,998,695

MULTIPLE ARRANGEABLE STRIP SUPPORT FOR A BAG

George Nobis, 3545 Norland Ct., Norfolk, Va. 23513

Filed May 30, 1989, Ser. No. 358,077
Int. Cl.[5] B65B *67/04*
U.S. Cl. 248—101 **4 Claims**



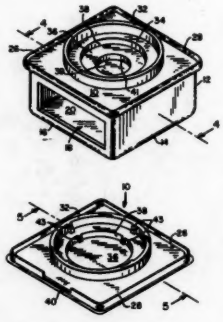
1. A support for a plastic bag comprising an elongated flexible strip, a pair of opposing slots extending inwardly from opposite ends thereof each one of said slots terminating in a same common plane medially of the strip, said location of the slots forming tabs at the end of said strip when the strip is bent at the slots, and at least one opening provided in each tab, said one openings be substantially aligned with each other whereby the tabs can be optionally interengaged, or place in abutting relationship, or used in a separated relationship whereby when fasteners are placed in said at least one opening the strip will assume at least a semi-circular shape to support a plastic bag or the like thereon.

4,998,696

PAINT CAN CADDY

Warren Desjardins, 18 Bonita Rd., East Quogue, N.Y. 11942

Continuation-in-part of Ser. No. 258,010, Oct. 14, 1988, Pat. No. 4,890,807. This application Nov. 29, 1989, Ser. No. 442,919
Int. Cl.[5] A47G *23/02*
U.S. Cl. 248—146 **6 Claims**



1. A paint can caddy comprising:
(a) a base unit containing a flat floor and having a side wall

extending vertically from the perimeter of the floor with at least one opening in said side wall of sufficient size to permit access within said base unit, the tip perimeter of said side wall having a beaded lip; and

(b) a top panel adapted to fit securely on the top of said base unit, the underside of said top panel having a channeled rim about the perimeter thereof adapted to fit integrally over the beaded lip, said top panel having a circular lip extending upwardly a short distance and attached symmetrically therewithin a first annular platform for holding a can of paint and a circular depression symmetrical within said first platform forming a second annular platform having a perimetrical wall for supporting a can of paint of a smaller diameter than may be supported by said first platform.

4,998,697

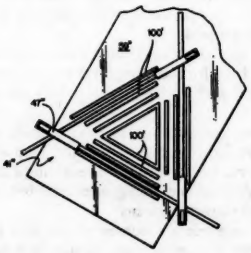
THREE LEGGED WORKBENCH FRAME

Joseph R. Esposito, 329 Hickok Ave., Syracuse, N.Y. 13206

Continuation-in-part of Ser. No. 231,829, Aug. 12, 1988, Pat. No. 4,854,531. This application Jul. 31, 1989, Ser. No. 387,337

Int. Cl.[5] F16M *11/00*

U.S. Cl. 248—165 **12 Claims**



1. A three legged workbench frame suitable for use on a rough, uneven support surface that includes a frame having three interlocking sections, each section further including a vertically disposed leg for supporting the frame on a support surface, a horizontally disposed beam, and a corner bracket for joining one end of the beam to the top of said leg, each corner bracket having a slot passing downwardly through the top surface thereof behind said one end of the beam, said slot being disposed at an acute angle with reference to said beam and extending downwardly to a depth equal to the height of said beam for slidably receiving a second beam contained in another section therein so that three sections form an adjustable triangular shaped frame.

4,998,698

GLUE GUN HOLDER APPARATUS

Jon P. Martinson, 2034 Peoria Pl., Oxnard, Calif. 93033

Filed Dec. 29, 1989, Ser. No. 459,248

Int. Cl.[5] F16M *11/00*

U.S. Cl. 248—176 **2 Claims**

1. A glue gun holder apparatus for securement of a glue gun therein, wherein the gun includes a central body, with a handle extending generally orthogonally to the central body, and further including a trigger switch mounted within the handle, and a clip mounted forwardly of the trigger onto the central body, the apparatus comprising in combination,

a support base including a top planar surface defined by a rear edge, a forward edge, a right side, and a left side, and

a registration container mounted to the top surface adjacent the rear edge and right side, and

a support wall mounted to the top surface oriented forwardly of the registration container for mounting the glue gun body thereon, and

a plate positioned forwardly of the support wall to receive excessive glue deposited thereon, and

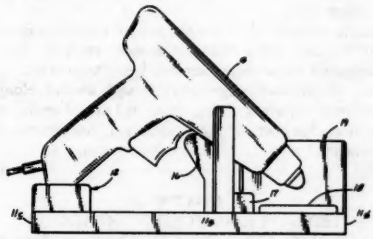
a glue gun magazine container mounted integrally to the top surface adjacent the plate, and

wherein the plate is defined by a planar ceramic plate of greater density that that defined by the support base to enhance cleaning and maintenance of the plate, and

wherein the registration container includes four vertical walls mounted orthogonally relative to the base, each of the four walls includes a downwardly sloping interior surface directed interiorly of the container to receive the handle of the glue gun therein, and

wherein each of the four walls is of a predetermined height, the support wall is defined by a further predetermined height greater than that defined by the predetermined height, and

including a left leg mounted to a left side of the support wall, and a right leg mounted to a right side wall of the support wall, the left leg and right leg extending above the forward wall to receive the body of the glue gun therebetween, and



wherein the support wall is of a generally "L" shaped configuration with an upper portion of the forward wall directed rearwardly and in alignment with the registration container, and the free terminal end of the support wall defined by an arcuate forward surface to contact the body of the glue gun in a non-marring or non-abrasive manner, and

further including a clip mounting block integrally mounted to the top planar surface of the support base adjacent a forward surface of the support base, and rearwardly of a rear edge of the ceramic plate to receive the clip thereon, the block defined by a yet further predetermined height less than the predetermined height of the registration container, and

further including a tip cleaning block mounted rearwardly of the magazine, and

wherein the tip cleaning block includes a series of conical recesses formed therewithin for cleaning of a glue extrusion tip of the glue gun, and

wherein each of the conical recess is defined by a ribbed interior conical surface.

4,998,699

CHAIR BOOTIE

Sandra F. Butler, 2495 Ball Park Dr., Tucker, Ga. 30084

Filed Dec. 21, 1989, Ser. No. 454,072

Int. Cl.[5] A47B *91/00*

U.S. Cl. 248—188.7 **4 Claims**

1. A bootie for a chair having a shaft with a leg connected to said shaft and a wheel attached to said leg, comprising:

a top member defining an opening of a size sufficient for said shaft to pass through, said top member extending from said shaft along said leg;

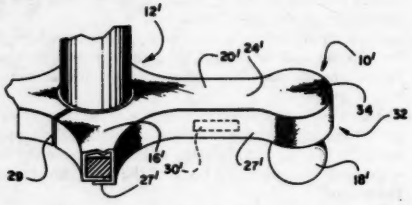
a first fastener strip mounted on said leg;

a second, mating fastener strip attached to said top member, one of said fastener strips having a surface of tiny hooks and the other of said fastener strips having a pile surface,

said surfaces being mateable and releasably interlocking when pressed together; and

a skirt connected to said top member and extending downwardly therefrom toward said wheels, said top member and said skirt substantially covering said leg and said wheel; and

wherein: said top member has an elongated rectangular configuration with a first longitudinal edge portion, a



second longitudinal edge portion, and a tranverse edge portion; and

wherein said skirt has a first and second elongated rectangular member and a third rectangular member, said first elongated rectangular member being connected to said first longitudinal edge portion, said second elongated rectangular member being connected to said second longitudinal edge portion, said third rectangular member being connected to said tranverse edge portion:

4,998,700

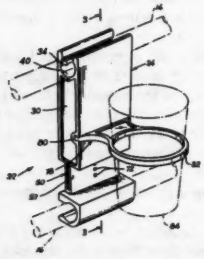
BED SIDE RAIL HOLDING BRACKET

Phyllis J. McKaig, 1536 S. Rugby Pl., East Ridge, Tenn. 37412

Filed Apr. 23, 1990, Ser. No. 512,956

Int. Cl.[5] A47B *96/06*

U.S. Cl. 248—214 **17 Claims**



1. A mounting bracket for attachment to devices having side rails including an upper and a lower longitudinally extending rail, said bracket comprising a housing including top, bottom, front and rear walls, a first open end clamping slot formed by said top wall and portions of said front and rear walls for receiving and clamping about said upper rail, a hollow formed within said housing, an opening formed in said bottom wall communicating with said hollow, an arm having an upper end and a lower end, the upper end of said arm extending through said opening into said hollow for telescopic movement of said arm relative to said housing, a body member formed at the lower end of said arm, said body member being larger than said opening so as to be precluded from entry into said body member, a second open end clamping slot formed in said body member, said second slot opening rearwardly relative to said housing and adapted for receiving and clamping about said lower rail when said arm is adjustably positioned, a shelf for holding selected items for use by a bedridden or other disabled person, and cooperative means formed in said front wall and said shelf for securely connecting said shelf to said housing selectively.

4,998,701

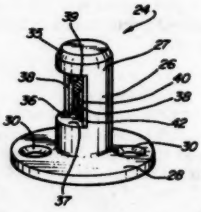
DECORATIVE HARDWARE MOUNTING SYSTEM

Kenneth E. Rawald, Huntington Beach, Calif., assignor to Masco Building Products Corp., Taylor, Mich.

Filed Dec. 21, 1989, Ser. No. 454,212

Int. Cl.[5] A47B *96/00*

U.S. Cl. 248—224.3 **8 Claims**



1. A concealed mounting assembly characterized by:

an outer post member having a bore extending therein and a lateral aperture extending from the bore to an external surface of the post;

a concealed bracket means having a post seat section sized to fit in said bore for mounting said post thereon;

said post seat section having an axially extending recess section;

an adjustable engagement member sized to be axially adjustable within said recess section and alignable with said lateral aperture with means for receiving a fastener which secures said post and engagement member onto said concealed inner bracket means;

an annular rose plate mounted about said post seat and against said mounting plate section and secured thereagainst by abutment against said outer post member such that said mounting plate section is concealed behind said rose plate.

4,998,702

SUSPENSION APPARATUS FOR CONTROL DEVICE

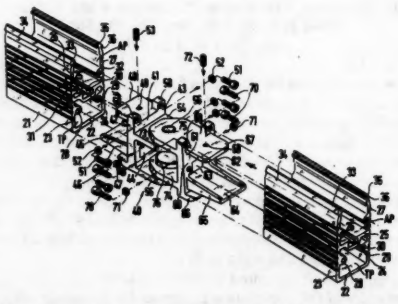
Wolfgang Reuter, Burbach-Wurgendorf; Jurgen Debus, Dietzholztal, and Lothar Lehr, Burbach-Oberdresselndorf, all of Fed. Rep. of Germany, assignors to Rittal-Werk Rudolf Loh GmbH & Co. KG, Fed. Rep. of Germany

Filed Feb. 21, 1989, Ser. No. 313,583

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1988, 3805424

Int. Cl.[5] F16M *13/00*

U.S. Cl. 248—278 **22 Claims**



1. In a suspension apparatus for control devices which can

be assembled from a connection flange, connection rotary joint, support beam sections, elbow joints, and intermediary joints, which can be connected with a wall and a body of a machine, and a coupling unit which can be connected to the control device, in which the support beam sections each comprise an essentially U-shaped base profile section and a cover profile section closing the same, the base profile section being divided with a separating bar parallel to a crossbar and proceeding into a support part constructed as a closed hollow profile and an open U-shaped mounting part opposed to the separating bar, and in which connecting bars which proceed in a longitudinal direction in the support bar and in the mounting part are integrally formed with screw mountings, the improvement comprising:

said intermediary joints (**11, 40**) having two mounting attachment plate (**41, 60**), which occupy less than a cross-section of said mounting parts (AP) of said base profile section (**21**) and have borings (**50, 69**) for attachment mounting screws (**51, 70**) oriented to a distribution of screw mountings into said connecting bars (**28, 29, 31, 32**) of said base profile sections (**21**) of said support beam sections (**20**) acting on one another;

first, second, third and fourth vertically projecting guide plates (**45, 48; 64, 67**), insertable into said support part (TP) and said mounting part (AP) of said base profile sections (**21**) and abutting therein, integrally formed on sides of said mounting attachment plates (**41, 60**) positioned toward front sides of said base profile section (**21**);

first, second, third and fourth spaced bearing support brackets (**54, 55** and **73, 74**) said first and third bearing support brackets displaced relative to said second and fourth bearing support brackets by a thickness of said bearing support brackets (**54, 55, 73, 74**)having aligning bearing support borings (**75**) for accommodating at least one of bearing support bolts (**56**) and bearing support elements (**76**), said spaced bearing support brackets (**54, 55** and **73, 74**) each integrally formed projecting vertically to sides of said attachment plates (**41, 60**); and

each said intermediary joint (**11, 40**) covered with a pleated bellows fixed onto said base profile sections (**21**), closed with said cover profile sections (**37**) of said base profile sections (**21**) of said support beam sections (**20**) acting on one another.

4,998,703

PORTABLE ILLUMINATED BOOKHOLDER AND LECTERN

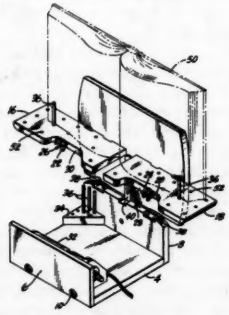
Richard M. Stewart, 236 Central Rd., Middlebury, Conn. 06762

Filed Apr. 23, 1990, Ser. No. 512,490

The portion of the term of this patent subsequent to Jan. 23, 2007, has been disclaimed.

Int. Cl.[5] **A47B** *97/04*

U.S. Cl. 248—447 **10 Claims**



1. An improved bookholder, comprising:

a lower part having a base member and having spaced upstanding front and rear walls attached thereto,

an upper part having a top member and having spaced depending left and right side walls attached thereto,

said depending left and right side walls of said upper part being so spaced and dimensioned as to provide a complementary fit with said upstanding front and rear walls of said lower part, thereby defining a box-like structure,

first means for temporarily orienting and fixing said side walls in spaced parallel relationship on said top member, said first means being adapted to re-orient and fix said side walls to support a book thereon,

second means for orienting and fixing said upper part to be supported from said lower part with said top member extending substantially vertically, so as to support a book on said re-oriented side walls.

4,998,704

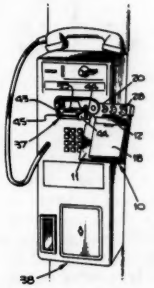
PORTABLE MEMO PAD HOLDER DEVICE FOR CAR AND PHONE

Kenneth A. Tarlow, Marina del Rey, Calif., and Ronald E. Gray, 2392 Stony La., Brea, Calif. 92621, assignors to Ron Gray, Brea, Calif.

Filed Jan. 11, 1990, Ser. No. 463,410

Int. Cl.[5] **A47F** *7/00*

U.S. Cl. 248—447.1 **10 Claims**



1. A portable memo pad holder device for transporting between vehicle and a remote telephone wherein the latter has a cradle with a hook therein, said hook normally freely movable up and down, the device comprising;

a generally planar main body portion having a generally flat front surface and a rear surface with a resilient clip mounted on said front surface for retaining a writing pad on said main body portion;

a cradle support pivotally mounted to said main body portion by a pivot member movable from a stored position adjacent said main body portion to a position extending outwardly away from said main body portion, said cradle support being a generally rectangular frame having an open generally rectangular area for receiving therein said hook in a manner allowing said hook to move freely up and down, said cradle support frame having a first enlarged portion at the top thereof on one side of said open area and a second enlarged portion at the top thereof on a side of said open area opposite said first mentioned one side of said open area, a first elongated generally horizontally extending member interconnecting said first and second enlarged portions, a side member extending downwardly from each of said enlarged portions, and a second elongated generally horizontally extending member interconnecting said side members, said enlarged portions, said side members, and said elongated members defining said frame, said rectangular area lying in generally a vertical plane, said enlarged member adjacent said pivot member

being wider than said enlarged member remote therefrom, each of said enlarged members having a groove formed in the lowermost portions thereof, each of said grooves opening downwardly with respect to said frame, each of said enlarged members extending away from the plane of said rectangular area and outwardly therefrom, said cradle being adapted to be received in said grooves; and

an abutment member on the rear surface of said main body position extending away therefrom adapted to abut against a supporting surface.

4,998,705

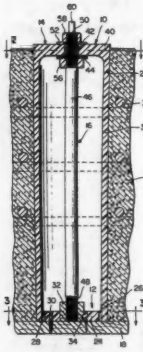
APPARATUS FOR FORMING VOIDS IN CONCRETE

Ronald L. Cass, 4329 Glenwood Ave., Ft. Myers, Fla. 33905

Filed Jul. 27, 1989, Ser. No. 385,403

Int. Cl.[5] E04G *15/06*

U.S. Cl. 249—177 **6 Claims**



5. An apparatus for forming voids in a hardenable material, said apparatus comprising a baseplate, means securing the baseplate to the surface of a form member for the hardenable material, a tubular sleeve engaging the form member and telescoped over the baseplate, means engaging said sleeve and said baseplate for releasably securing said sleeve to said baseplate, said means securing the sleeve to the baseplate being accessible for actuation externally of the sleeve, said means securing the sleeve to the baseplate including means exerting a force on the sleeve to extract said sleeve from the hardenable material when the securing means for the sleeve is disengaged from the baseplate.

4,998,706

VANE CORE ASSEMBLY FOR USE IN MAKING CENTRIFUGAL ELASTOMER COATED IMPELLERS

John Hyll, Salt Lake City, Utah, assignor to Baker International Corporation, Houston, Tex.

Continuation of Ser. No. 845,976, Mar. 31, 1986, Pat. No. 4,732,541, which is a division of Ser. No. 743,067, Jun. 10, 1985, Pat. No. 4,706,928. This application Mar. 21, 1988, Ser. No. 170,856

The portion of the term of this patent subsequent to Nov. 17, 2004, has been disclaimed.

Int. Cl.[5] B29C *33/48*

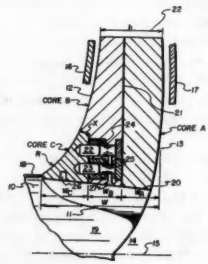
U.S. Cl. 249—184 **7 Claims**

1. A vane core assembly for use in forming a vane passage in an injection-formed, elastomer-covered, closed-shroud impeller, said vane core assembly comprising:

a first core element having a first length sized to extend from a central opening in said impeller to a periphery of said impeller;

a second core element detachably mated with said first core element, said second core element having a second length sized to extend from said central opening of said impeller to said periphery of said impeller; and

a third core element detachably mounted to said second core element by a pneumatically operatable separation means adapted for detaching said third core element from said



second core element, said third core element having a length sized to extend from said central opening of said impeller to a location within said impeller short of said impeller periphery, said third length being dimensionally less than said first length and said second length.

4,998,707

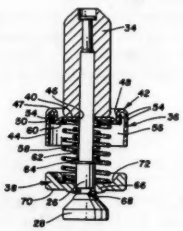
EXHAUST GAS RECIRCULATION VALVE ASSEMBLY

Karen M. Meyer, Avon; Michael D. Liggett, Rochester; Robert J. Conklin, Rochester, and Charles J. Barker, Rochester, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 13, 1990, Ser. No. 538,045

Int. Cl.[5] F16K *31/06, 41/00, 49/00*

U.S. Cl. 251—129.15 **8 Claims**



1. An exhaust gas recirculation valve assembly comprising:

a base having a valve member disposed therein for controlling exhaust gas flow therethrough, an actuator mounted in spaced relationship to said base, and a valve stem extending between said actuator and said valve member, said actuator energizable to operate said valve stem and valve member in said base

an actuator seal, disposed between said actuator and said base, having a generally inverted, cup-shaped configuration, with a central disc portion having an aperture through which said valve stem extends, a raised peripheral seal portion extending about the circumference of said disc portion, a skirt portion extending downwardly from said peripheral seal portion to a position above said base to enclose said valve stem and, an aperture in said skirt to promote air circulation through said seal;

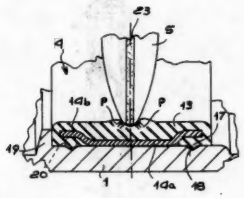
means for biasing said actuator seal upwardly to engage said peripheral seal portion with said actuator thereby enclosing the interface between said actuator and said valve stem to reduce impingement of contaminants thereon while permitting lateral movement of said valve stem relative to said actuator.

4,998,708

BUTTERFLY VALVE WITH A SEALING ELEMENT OF ELASTOMERIC MATERIAL WITH AN INTERNAL METAL REINFORCEMENT

Roberto Pavanel, Osnago, Italy, assignor to Cazzaniga S.p.A., Milan, Italy

Filed Sep. 15, 1989, Ser. No. 407,959
Claims priority, application Italy, Oct. 6, 1988, 22211 A/88
Int. Cl.[5] F16K *1/22*
U.S. Cl. 251—306 5 Claims



1. A butterfly valve, comprising:

a tubular valve body having fittings at opposite ends for connection to a conduit, a substantially cylindrical seat between said fittings, a shaft bore formed in said body and opening into said seat transversely to an axis thereof, an inwardly extending annular ledge projecting from said seat at one axial end of said seat, and a pair of annular grooves formed in said seat at opposite axial ends thereof;

a seal of elastomeric material received in said seat and axially abutting said ledge, said seal being formed with a metal ring at least partially embedded in said elastic material and extending substantially over the entire length of said seal, said ring having a median portion of an outer diameter equal to an outer diameter of said seal and directly resting against said seat and end portions set inwardly from said seat whereby thicknesses of said elastomeric material separate said end portions from said seat, said seal being formed with a hole aligned with said bore and said ring having an opening with an edge set back from said hole, said seal further comprising a pair of annular ribs along an outer periphery of said seal and formed of said elastomeric material, said ribs being dimensioned to be received in said grooves under elastic compression, said end portions of said ring overlapping said ribs, said seal having a layer of said elastic material inwardly of said median portion;

a disk-shaped shutter received in said seal and having a periphery resiliently engaging said layer;

a shaft rotationally coupled with said disk-shaped shutter, traversing said bore and said hole and sealingly engaged by a portion of said material between said edge and said hole; and

means for rotating said shutter connected to said shaft externally of said body.

4,998,709

METHOD OF MAKING GRAPHITE ELECTRODE NIPPLE

Robert R. Griffin; Keith M. Roussel, and Ta-Wei Fu, all of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Continuation-in-part of Ser. No. 210,689, Jun. 23, 1988, abandoned. This application Apr. 19, 1990, Ser. No. 513,468
Int. Cl.[5] C01B *31/00*
U.S. Cl. 264—29.5 6 Claims

1. A process for producing graphite nipples suitable for connecting graphite electrodes which comprises the steps of:

(a) adding from about 8 weight percent to about 20 weight percent of carbon fibers produced from spun mesophase pitch to from about 45 weight percent to about 65 weight percent of premium coke and from about 22 weight percent to about 28 weight percent of a binder to form an extrusion blend,

(b) extruding the extrusion blend to form an elongated carbon nipple,

(c) subjecting the carbon nipple to a temperature of from about 760° C. to about 982° C. for from about 2 weeks to about 5 weeks to produce a baked carbon nipple; and

(d) subjecting the baked carbon nipple to a temperature above about 2,704° C. from about 5 days to about 14 days to produce a graphite nipple.

4,998,710

APPARATUS FOR HOLDING AND REFINING OF MOLTEN ALUMINUM

John F. Pelton, Yorktown Heights, N.Y., assignor to Union Carbide Industrial Gases Technology Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 53,039, May 22, 1987. This application Nov. 14, 1989, Ser. No. 436,829
Int. Cl.[5] C04B *35/02*
U.S. Cl. 266—286 18 Claims

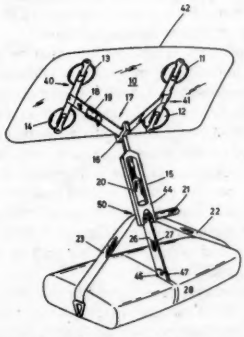
1. In a vessel adapted for the holding and refining of molten aluminum, and alloys thereof, in which an outer vessel shell has a refractory insulating lining on the bottom and side walls thereof, said lining being impervious to molten aluminum, the improvement comprising employing, for at least a portion of said lining, refractory fibrous insulating material having a very low density of below about 80 lb/ft^3, said material having a very low thermal conductivity of below 1.8 $BTU/hr/ft^2$ at a temperature gradient of 1° F. per inch at 1500° F., said refractory fibrous insulating material containing an alkaline or alkaline earth metal fluoride or fluosilicate therein in an amount within the range of from about 0.5 to about 5 % by weight based on the weight of said refractory fibrous insulating material, said fibrous insulating material not being infiltratable by the passage of molten aluminum into the inner voids thereof, whereby the presence of said metal fluoride or fluosilicate serves to effectively prevent the undesired infiltration of the refractory fibrous insulating material lining that serves as a molten aluminum barrier as well as an insulating lining.

4,998,711

WORKPIECE HOLDER AND METHOD OF INSTALLING A VEHICLE WINDSHIELD THEREWITH

Donald M. Borg, R.R. 1, Orton, Ontario, Canada L0N 1N0

Filed Feb. 23, 1990, Ser. No. 484,174
Int. Cl.[5] B25B *11/00*
U.S. Cl. 269—21 2 Claims



1. In a means for holding a windshield workpiece in a vehicle body opening while said windshield workpiece is being set and fitted thereto, the combination of; a pair of suction cups

adapted to be fitted each on the one half side of the inside surface face of a vehicle windshield;

a looped strap means attached to each suction cup means, said strap hanging between the cups downwardly within the vehicle body;

a turnbuckle member adjustably fitted to the mid point of said looped strap by a roller member on one end of said turnbuckle;

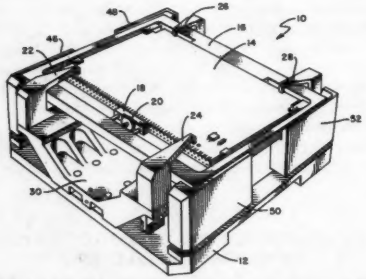
a clamping member fitted to another end of said turnbuckle and adapted to hold together in mating relationship both the driver side safety belt and the passenger side safety belt thereby providing an easily fastenable and releaseable means for maintaining a windshield in a vehicle body window opening cavity while said windshield is being bonded to the peripheral edge of the window opening cavity.

4,998,712

PRINTED WIRING BOARD FIXTURE APPARATUS

Joon Park, Glendale; Stanley Taketani, Garden Grove; Han C. Leung, Los Angeles, and George Pelzman, El Segundo, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 30, 1990, Ser. No. 502,374
Int. Cl.[5] B23Q *3/18*
U.S. Cl. 269—25 **29 Claims**



1. A printed wiring board fixture apparatus comprising:

a base;

at least four fingers wherein there are fingers comprising a first pair of fingers and a second pair of fingers, said fingers moveably mounted on said base, said fingers being movable from a first, spread position to a second, adjacent position, said fingers defining a plane;

at least three lifters assemblies mounted on said base, said lifter assemblies being movable on said base from a first, lowered position to a second, raised position;

mounting means on said lifter assemblies for receiving a printed wiring board holding frame so that the frame may be engaged on said mounting means with said fingers and said lifter assemblies in their first position whereupon said fingers are moved to their second position and said lifter assemblies are moved to their second position to lift the printed wiring board into engagement with said fingers so that the printed wiring board lies with its top surface on said plane; and

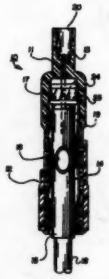
first and second carriages moveably mounted on said base, said first pair of fingers being mounted on said first carriage and said second pair of fingers being mounted on said second carriage so that motion of said carriages moves said fingers between their first and second positions.

4,998,713

NEEDLE CONNECTOR

Vincent L. Vaillancourt, 14 Bunyan Dr., Livingston, N.J.

Filed Jan. 10, 1990, Ser. No. 463,243
Int. Cl.[5] A61M *25/00*
U.S. Cl. 604—283 **31 Claims**



1. A needle connector for mounting on a Y-site connector, said needle connector including

a first tubular part having a first chamber at one end for receiving a hollow needle, a second chamber at an opposite end coaxial of said first chamber for communication therewith, and an axial slot at said one end for passage of an arm of a Y-site connector therethrough; and

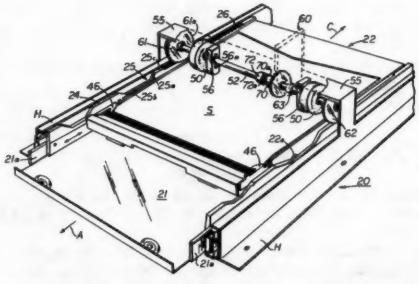
a second tubular part rotatably secured to said first tubular part in coaxial relation for fitting over a Y-site connector, said second part having an axial slot for passage of the arm of the Y-site connector and a surface for engaging the Y-site connector arm to bias the Y-site connector into said first part towards a needle therein in response to rotation of said second part relative to said first part.

4,998,714

SHEET-FEEDING APPARATUS WITH ONE-WAY CLUTCH TO AVOID PREMATURE SHEET-FEED DURING SHEET RELOADING

Steven J. Sparer, Rochester, and William I. Morris, Oakfield, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 18, 1989, Ser. No. 408,824
Int. Cl.[5] B65H *3/06*
U.S. Cl. 271—117 **6 Claims**



1. Sheet-feeding apparatus for use in a sheet-processing device for feeding sheet material along a predetermined path toward a sheet processing station, said apparatus comprising:

(a) a sheet supply station including means for supporting a stack of sheet material, said stack-supporting means being slidable along a rectilinear path between an operative, sheet-feeding position and an inoperative, sheet-loading position, said stack-supporting means having means defin-

ing a cam surface associated therewith which moves parallel to said rectilinear path during sliding movement of said stack-supporting means;

(b) sheet-feeding means located at a fixed location along said predetermined path for feeding sheet material, seriatim, from a stack of sheet material supported by said stack-supporting means when said stack-supporting means is located in its operative, sheet-feeding position, said sheet-feeding means comprising at least one sheet-feeding roller rigidly mounted on a rotatably-mounted drive shaft, said shaft being supported for movement perpendicular to said predetermined path between a first position in which said shaft locates said roller in a first position in which it engages the top-most sheet of a stack of sheet material supported by said stack-supporting means when positioned in said operative, sheet-feeding position, and a second position in which said shaft locates said roller in a position spaced from said topmost sheet, said sheet-feeding means further including means for biasing said shaft towards its first position; and

(c) drive means for selectively rotating said drive shaft to cause said roller to feed the top-most sheet in the stack when said roller is positioned to engage such sheet; and

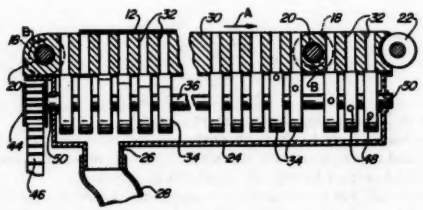
(d) cam-follower means including a roller member rotatably mounted on said shaft and positioned to engage said cam surface during movement of said sheet-supporting means along said predetermined path, said cam surface being shaped to cause said drive shaft to move from said first position to said second position during movement of said sheet-supporting means between its operative and inoperative positions, respectively, said roller member being mounted on said shaft by means of a one-way clutch, whereby said roller member is rigidly coupled to said shaft during rotation of said roller member in a first direction, and decoupled from said shaft during rotation of said roller member in an opposite direction.

4,998,715

COPY SHEET HOLDDOWN SYSTEM

Otto G. Milan, Arlington Heights, and Stanley Witczak, Chicago, both of Ill., assignors to AM International, Inc., Chicago, Ill.

Filed Nov. 18, 1988, Ser. No. 274,270
Int. Cl.[5] B65H *5/22*
U.S. Cl. 271—197 **8 Claims**



1. In a printing, copying, duplicating and like machine, a copy sheet feeding system, comprising:

conveyor board means including at least a pair of generally parallel, movable belts for engaging the copy sheets and for moving the copy sheets over the conveyor board in seriatim fashion, the belts being transversely spaced to define an open area therebetween;

a common vacuum chamber extending lengthwise of the conveyor board means;

a manifold having a plurality of openings in an array longitudinally of the conveyor board means communicating between the common vacuum chamber and the open area between the movable belts;

mechanical vacuum accessing means operatively associated with the manifold for opening and closing only some of the openings and communicating only a lengthwise portion of the common vacuum chamber with a portion of the open area of the conveyor board between the movable belts to hold a copy sheet on the conveyor board means when in that portion of the area; and

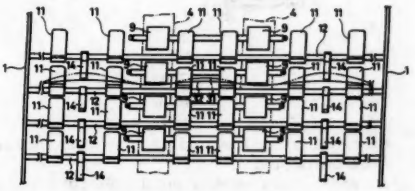
singular drive means for effectively moving the mechanical vacuum accessing means relative to the vacuum chamber lengthwise of the conveyor board means for movement with the copy sheet to hold the copy sheet on the conveyor board means along a substantial length thereof.

4,998,716

SORTER WITH JAM-PREVENTING MEMBERS

Keiji Okumura, Amagasaki, and Kenichi Matsunobu, Nara, both of Japan, assignors to Mita Industrial Co., Ltd., Osaka, Japan

Filed Jul. 5, 1989, Ser. No. 375,754
Claims priority, application Japan, Jul. 11, 1988, 63-172388
Int. Cl.[5] B65H *39/10*
U.S. Cl. 271—297 **10 Claims**



1. A sorter for sorting sheets comprising:

a plurality of juxtaposed sheet-receiving means;

conveying means for conveying successive sheets;

a plurality of successive sheet delivery means disposed between each of said sheet-receiving means and said conveying means for selectively delivering a sheet to a respective sheet-receiving means;

said sheet delivery means comprising a guide means moveable from a non-delivery position to a delivery position, said guide means delivering a sheet to a respective sheet-receiving means along a delivery path when in said delivery position while allowing said sheets to by-pass the respective sheet delivery means when in said non-delivery position;

said sheet delivery means further comprising restriction means extending to a restricting position juxtaposed to the delivery path of a sheet being delivered by the next successive sheet delivery means to prevent the last said sheet from waving as the last said sheet is being delivered by said next successive sheet delivery means to the respective sheet receiving means.

4,998,717

IMPACT-ABSORBING SAFETY MATTING SYSTEM FOR A HELIPAD

Thomas M. Vaux, 437 Tenth Ave. W., Kirkland, Wash. 98033

Division of Ser. No. 152,817, Feb. 5, 1988, Pat. No. 4,846,457, which is a continuation-in-part of Ser. No. 767,718, Apr. 23, 1986, Pat. No. 4,727,697, which is a continuation of Ser. No. 364,811, Apr. 2, 1982, abandoned. This application Jul. 10, 1989, Ser. No. 377,187
The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.
Int. Cl.[5] A63B *5/18*
U.S. Cl. 272—3 **15 Claims**

1. A helipad, for placement on a base, comprising:

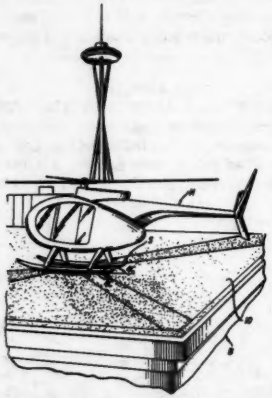
a surface layer having a bottom and outer edges;

an array of air-filled cells affixed to the bottom of the surface layer;

rib means, extending from the bottom of the surface layer, for defining the array of air-filled cells;

sealer and aggregate spread over the surface layer and the base immediate to edges of the helipad;

a plurality of median rib means, extending a shorter distance from the bottom of the surface layer than the defining rib means, for giving added support against a strong blow



striking the surface layer and the array of air-filled cells affixed thereto; and

at least one void area means, arranged in place of at least one of the plurality of median rib means, for facilitating cutting of the helipad through the surface layer.

4,998,718

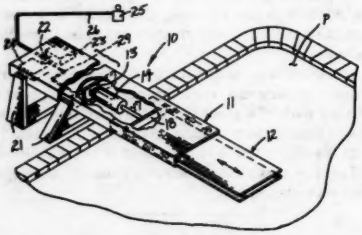
SPRING DIVING BOARD SAFETY APPARATUS

Jacob Arens, Box 925, Edson, Alberta, Canada 70E0P0

Filed Nov. 20, 1989, Ser. No. 439,159

Int. Cl.[5] A63B *5/10*

U.S. Cl. 272—66 **1 Claim**



1. A diving board safety apparatus comprising:

an elongate hollow housing and a diving board extension telescopingly received within said hollow housing and positionable from a first extended position relative to said hollow housing to a second retracted position within said hollow housing,

drive means mounted in the hollow housing for removably positioning said diving board extension from said first position to said second position, and

manual control means for remotely actuating said drive means,

wherein said drive means includes a pneumatic compressor for providing pneumatic pressure to a pneumatic cylinder, said pneumatic cylinder contains a piston extensible and retractable relative to said pneumatic cylinder, and said pneumatic cylinder pivotally mounted to said hollow housing at a rearward end of said pneumatic cylinder, and said piston includes a piston rod pivotally mounted to said diving board extension at a forward end of said pneumatic cylinder,

wherein said piston rod includes a piston plate orthogonally and pivotally mounted interiorly of said diving board extension, a cylinder plate orthogonally and pivotally mounted to said pneumatic cylinder and also mounted interiorly of said hollow housing,

wherein said diving board extension includes an elongate central chamber and C-shaped channel side chambers, and the hollow housing includes a plurality of upper and lower roller means mounted on each interior side of said hollow housing to guidingly associate with each C-shaped chamber to maintain said diving board extension in an aligned position relative to said hollow housing,

wherein said plurality of upper and lower roller means includes a plurality of upper rollers, a plurality of lower rollers, and

wherein each of said plurality of upper and lower roller means includes an off-set L-shaped bracket, one end of said off-set L-shaped bracket having an axle and a respective roller rotatably mounted through said axle, and a further end of said off-set L-shaped bracket is fixedly secured to a respective interior side wall of said hollow housing.

4,998,719

JUDO TRAINING DEVICE

Frantisek Jahoda, Am Schreiberg 7, A-5201 Seekirchen, Austria

Filed Nov. 29, 1988, Ser. No. 277,676

Int. Cl.[5] A63B *69/00*

U.S. Cl. 272—76 **7 Claims**

1. A judo training device comprising:

an elastic body having a centrally located axis therethrough and having a circular bottom part curving upwardly; said bottom part having a large radius of curvature;

a circular top part formed as an upper portion of said elastic body and tapering upwardly and inwardly from said circular bottom portion towards said central axis; said top part having a radius of curvature smaller than the bottom part;

an intermediate portion connecting said top part to said bottom part, said intermediate portion comprising (a) a first curved end attached to said bottom part with the first curved end being convex shaped, (b) a second curved end attached to said top part with the second curved end being concave shaped, and (c) a straight section connecting said first curved end to said second curved end;

said body having an elastic cord exiting from said top part;

said bottom part being provided with a friction covering on a bottom surface thereof for increasing the sliding friction on a judo mat; and

wherein the curvature of the circular bottom portion part

and the resulting line of the tapered top part conform to the shape of the foot;

whereby a judo trainee can move his leg to sweep the judo training device during practice therewith to learn judo sweeping motions.

4,998,720

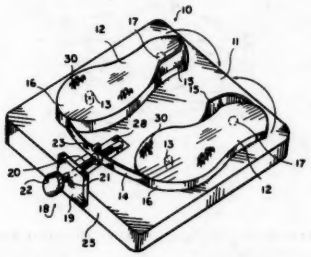
EXERCISE DEVICE

Insop Kim, 4-21 Schorr Dr., College Point, N.Y. 11356

Filed Mar. 2, 1990, Ser. No. 487,129

Int. Cl.[5] A63B *23/04*

U.S. Cl. 272—96 **8 Claims**



1. An exercising device for strengthening the muscles of the upper leg and spincter region including:

a base platform comprisign a smooth planar surface and having a front and a rear edge;

a pair of foot platforms having forward and rear portions for placement of each foot of a user mounted atop said base platform and at substantially opposite ends of said base platform;

pivoting means attached between the planar surface of said base platform and an underside of said foot platforms pivotally mounting said foot platforms to said base platform, said pivoting means being attached to a forward portion of said foot platforms;

support means disposed under said foot platforms and stop said planar surface allowing said foot platforms to move smoothly over said planar surface and said user to stand in a normal fashion;

elastic tensioning means disposed between and connecting said forward portins of said foot platforms; and

whereby the user of said device places each foot on a foot platform and turns his heels inward against the resistance of said elastic tensioning member to exercise the muscles of the upper leg and the spincter region.

4,998,721

WEIGHTLIFTER'S EXERCISING APPARATUS

Douglas H. Anders, 2512 N. 65th St., Omaha, Nebr. 68104, and Ronald D. Walton, 5055 S. 161st Cir., Omaha, Nebr. 68135

Filed Apr. 18, 1989, Ser. No. 339,655

Int. Cl.[5] A63B *21/06*

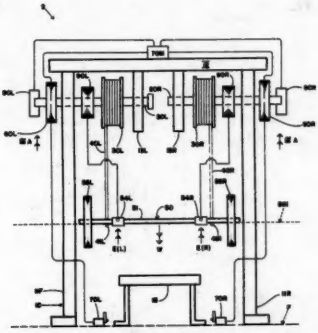
U.S. Cl. 272—118 **4 Claims**

1. Exercising apparatus for enabling a weightlifter athlete to safely utilize the athlete's total physiological energy in vertically reciprocating along a range of vertical height a barbell that gravimetrically surpasses the athlete's total physiological energy, said barbell conventionally comprising a horizontal laterally extending elongate bar as a minor proportion of the barbell gravimetric weight and laterally separated discs as the major proportion of the barbell gravimetric weight, said enabling exercising apparatus comprising:

(A) a framework means including columns extending vertically upwardly from environmental horizontal flooring and also including a horizontal header portion attached to said columns and loftily overlying said flooring;

(B) nearer to said header than to said flooring and journalled by said framework means, a pair of independently rotatable laterally extending horizontal shafts including a left-shaft and a right-shaft, said left-shaft being provided with a left-drum wrapped with a left-cable and said right-shaft being provided with a right-drum wrapped with a right-cable, said respective cables and below said rotatable shafts being attached to laterally separated locations of and suspending the vertically reciprocatable barbell bar portion whereby said vertically reciprocatable barbell is movable multi-directionally in free-weight fashion along the horizontal plane of the barbell bar;

(C) a left-motor adapted to powerably rotate said left-shaft and left-drum, and a right-motor adapted to powerably rotate said right-shaft and right-drum;



(D) motor control means for independently actuating the respective motors and thereby apply upward force to the barbell horizontal bar through attachment cables, whereby the athlete's total physiological energy, and supplementally assistable with said respective motors, will be sufficient to vertically lift the barbell; and

(E) said left-shaft being provided with a brake means and said right-shaft being provided with another brake means, whereby said separate brake means are adapted to control rotation of the left-drum and right-drum, respectively, to control barbell movement in the downward direction.

4,998,722

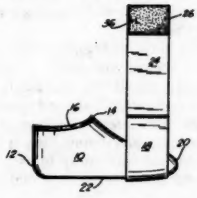
ISOTONIC EXERCISING APPARATUS

James W. Scott, P.O. Box 7630, Tifton, Ga. 31793

Filed Dec. 14, 1990, Ser. No. 450,450

Int. Cl.[5] A63B *23/04*

U.S. Cl. 272—96 **8 Claims**



1. An exercising apparatus for the lower extremity comprising:

(a) an fabric member configured to fit around and enclose a user's foot;

(b) a loop of flexible material secured at its base portion around the toe-region of said fabric member, thereby positioning said fabric member within said loop, said loop extending above said toe-region to define an upper portion thereof;

(c) an elongated elastic member having its first, proximate end region secured to said loop at said upper portion thereof above said toe-region; and,

(d) attachment means secured to the opposite, distal end region of said elongated elastic member for attachment to a support for the user's lower extremity.

4,998,723

CABLE SUSPENDED DUMBELL AND BARBELL WEIGHTLIFTING APPARATUS

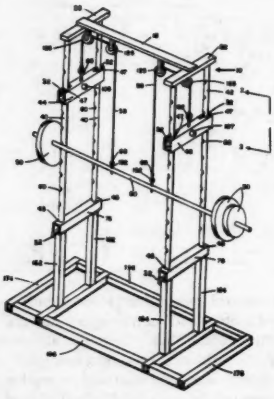
John G. Santoro, 1900 Dant Blvd., Reno, Nev. 89509

Filed Aug. 9, 1989, Ser. No. 395,066

The portion of the term of this patent subsequent to Jun. 19, 2007, has been disclaimed.

Int. Cl.[5] A63B *21/06*

U.S. Cl. 272—117 **20 Claims**



1. A weightlifting apparatus for preventing injury to a weight lifter comprising:

a framework including a pair of laterally spaced base sections, an upright support brace mounted on each base section, a lower support member mounted on the top of each support brace, a pair of spaced vertical uprights comprising vertical track support guide members extending vertically upwardly from each lower support member, said vertical uprights being positioned in proximity to each other creating a slot and having a plurality of aligned apertures extending therethrough at regular intervals, an upper support member mounted to and extending between the upper end of each pair of vertical uprights, an upper transverse bar mounted to and extending between said upper support members, and a pair of lower transverse bars mounted to and extending between said base sections;

a weight bearing bar;

a first and second slider, one slider being slidably mounted on each pair of vertical uprights;

two pairs of safety stop keys, one safety stop key being removably insertable in said aligned apertures of each said vertical upright, said safety stop keys extending through said vertical uprights and defining the upper limit of travel of said slider on said vertical uprights;

a first and second pulley system mounted on said upper support;

a first and second cable, said first cable having a first end connected to said first slider, being trained through said first pulley system and having a second end connected to said weight bearing bar, said second cable having a first end connected to said second slider, being trained through said second pulley system and having a second end connected to said weight bearing bar;

whereby said safety stop keys may be inserted into said vertical uprights at a predetermined location such that said safety stop keys will prevent upward travel of said slider and thus prevent downward travel of said weight bearing bar below a second predetermined location.

4,998,724

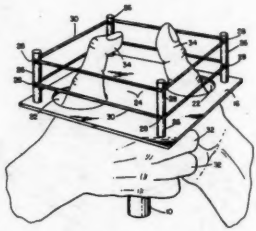
THUMB WRESTLING GAME APPARATUS WITH STABILIZING HANDLE

Richard B. Hartman, 7516 201st SE., Issaquah, Wash. 98027

Filed Aug. 10, 1990, Ser. No. 565,792

Int. Cl.[5] A63B *71/04*

U.S. Cl. 273—1 GI **5 Claims**



1. Apparatus for playing a game of thumb wrestling, said apparatus comprising:

(a) a stabilizing handle providing means for gripping said stabilizing handle between interlocking hands of opponents engaged in a game of thumb wrestling;

(b) said stabilizing handle providing means for employing pressure generated by interlocking hands of opponents to stabilize and anchor said stabilizing handle between players' hands;

(c) a game ring surface and means for joining the underside of said game ring surface to said stabilizing handle, wherein said game ring surface is stabilized and anchored upon stabilizing handle throughout competition;

(d) said game ring surface including a plurality of thumb holes for receiving the thumbs of opponents upwardly, wherein remaining fingers of opponents' interlocked hands grip said stabilizing handle below said game ring surface;

(e) said game ring surface including a solid wrestling region between said thumb holes providing resistance means for trapping a thumb of one opponent beneath the thumb of another opponent, wherein said resistance means provides for the accurate representation of the action of a pin in wrestling.

4,998,725

EXERCISE MACHINE CONTROLLER

Scott R. Watterson, River Heights; Donald J. Standing, and William T. Dalebout, both of Logan, all of Utah, assignors to Proform Fitness Products, Inc., Logan, Utah

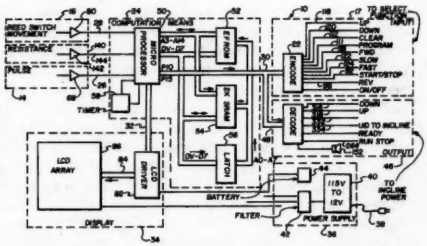
Filed Feb. 3, 1989, Ser. No. 306,872

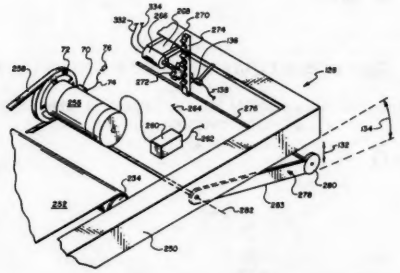
Int. Cl.[5] A63B *21/5*

U.S. Cl. 272—129 **17 Claims**

1. In an exercise machine having resistance means for exerting resistance to exercise movements performed by an user thereon, resistance adjustment means for varying said resistance means between an easy and a hard configuration, resistance detection means for detecting said resistance and providing resistance signals reflective thereof, movement detection means for detecting said exercise movement and providing movement signals reflective thereof, pulse detection means for detecting the pulse of said user and providing pulse signals reflective thereof, and a control console, said control console including an encoder for receiving said resistance signals, movement signals and pulse signals, timer means for providing time reference signals, input means operable by said user to

select exercise parameters including desired pulse rate and duration of exercise and to provide input signals reflective thereof to said encoder, computation means for computing and generating operating signals and display signals in response to said resistance signals, pulse signals, movement signals and input signals from said encoder, and time signals from said timer means, memory means for storing preset programs selectable by operation of said input means to provide a sequence of program signals to said computation means which in turn generates said operating signals in accordance with said preset programs, wherein said user selecting a desired operating mode and one or more exercise parameters corresponding to said desired operating mode by operation of said input means, and said computation means generating said operating signals according to said selected operating mode, display means for receiving and providing a display representative of said display signals, and output means for supplying said operating signals to operate said exercise machine, the improvement wherein:





said computation means compares said pulse signals to reference points specified by a preset program from said memory means and in response thereto supplies said operating signals via said output means to said resistance adjustment means for varying the resistance to achieve changes in said user's pulse rate as prescribed by said preset program, and

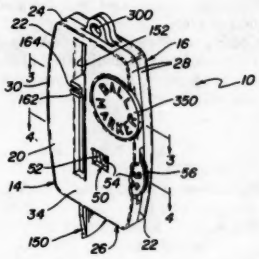
said memory means is further operable to receive and store an user-designed exercise program based on reference points and exercise parameters selected by said user via said input means, and wherein said input means is operable by said user to select said user-designed exercised program, said exercise parameters further including speed of the exercise movement and total simulated distance of the exercise movement, and said reference points including an upper limit pulse rate and desired pulse rates.

4,998,726

ACCESSORY FOR GOLFERS

John Budnick, 204 Benjamin Franklin Hwy., Douglassville, Pa. 19518

Filed May 4, 1990, Ser. No. 518,886
Int. Cl.[5] A63B 57/00
U.S. Cl. 273—32 A **10 Claims**



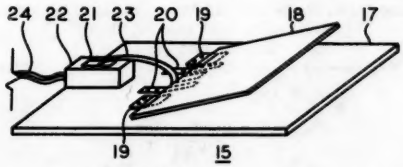
1. A small, light weight, integrated, self-contained device for assisting a golfer in playing a game of golf, comprising a generally rectangular two-piece case having a circular stroke counter means for counting said golfer's strokes, retractable cleaning tool means for cleaning golfing equipment, ball marker means for marking a golf ball position on the ground, ball marker retaining means for releasably securing said ball marker means to said case, and information display means for displaying information on said case, said generally rectangular two-piece case comprising front and rear pieces formed of a relatively rigid material, said front and rear pieces being fixedly secured to one another by connection means for securing said front and rear pieces together, each of said pieces having a generally planar wall defined by a peripheral edge, an upper and a lower end, a first side and a second side, said peripheral edges of said front and rear pieces being adapted to cooperate with each other to form said case for holding said ball marker means, said stroke counting means and said retractable cleaning means.

4,998,727

ATHLETIC TRAINING TIMER

Mel N. Person, 506 N. 4th St., Fruitland, Id. 83619

Filed Oct. 11, 1988, Ser. No. 255,442
Int. Cl.[5] A63B 67/00
U.S. Cl. 273—55 R **3 Claims**



1. An athletic training timer which comprises:

a foot switch, for use on a playing field, having first and second positions, said foot switch having a base plate being placed in direct contact with the playing field, a switch plate hinged to said base plate, wherein said first position has said switch plate disposed essentially parallel to said base plate and said second position has said switch plate and said base plate separated by an angular space, an electrical switch operably attached to said base plate and said switch plate, said electrical switch being configured to be responsive to said first and second positions to close and complete an electrical connection in said second position and means for remotely connecting said electrical switch to an audible signal means;

a timer remotely connected to said foot switch and operable to initiate a timing sequence responsive to a transition of the switch from the first position to the second position, and further operably connected to an audible signal means for activating the audible signal means after a selectable period of time;

means for selecting said period of time being operably connected to said timer;

means for producing a continuous audible signal for a selectable duration of time;

means for selecting the duration of audible signal time being operably connected to said audible signal means; and

means for supplying power to said timer and said audible signal means.

4,998,728

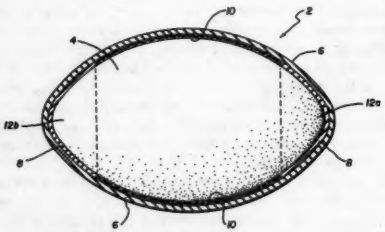
SOFT TIP FOOTBALL

Barry H. Traub, Dunwoody, Ga., assignor to Select Service & Supply Co., Inc., Atlanta, Ga.

Filed Aug. 14, 1990, Ser. No. 567,030

Int. Cl.[5] A63B *41/10*

U.S. Cl. 273—65 EB **3 Claims**



1. In a football having two relatively pointed ends and comprising an inflatable bladder, a reinforcement wrapping about said inflatable bladder, and a covering over said wrapped bladder, the improvement wherein the two ends of said football are rendered soft by limiting said reinforcement wrapping to a central portion of said bladder comprising 58–80% of the exterior length of said football as measured from one end to the other end, so that each of said two ends extending a length of 10–21% of said exterior of said football is not covered by reinforcement wrapping.

4,998,729

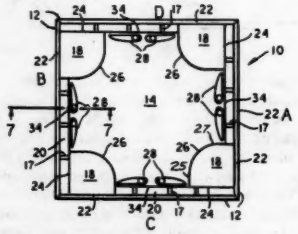
GAME BOARD

Christopher A. Lischerelli, 2212 Market St., Erie, Pa. 16510

Filed Apr. 10, 1990, Ser. No. 506,931

Int. Cl.[5] A63F *7/00*

U.S. Cl. 273—119 R **3 Claims**



1. In combination, a game board and marbles,

said game board being generally rectangular and comprising a bottom and having four side walls supported on said bottom extending upwardly therefrom defining four board corners and a false bottom,

spacers supported on said bottom supporting said false bottom,

spaced barriers supported on said false bottom adjacent each said board corner of said game board,

said spaced barriers defining a playing area on the central part of said false bottom,

each said spaced barrier having a first straight side, a second straight side, a third straight side, a fourth straight side and a curved side,

said first straight side joining said second straight side at a first barrier corner,

said second straight side joining said third straight side at a second barrier corner,

said first straight side joining said fourth straight side at a third barrier corner,

said third straight side and said fourth straight side joining said curved side,

each said third straight side and said fourth straight side being tangent to said curved side,

said first straight side of each said barrier being disposed substantially against one of said side walls,

said second straight side of said barrier being generally coextensive with a peripheral edge of said false bottom,

each of said peripheral edges of said false bottom terminating in spaced relation to said side walls providing pockets for said marbles therebetween,

a pair of swingable arms having a first end and a second end,

said first end of each said swingable arm being swingably attached to and supported on said false bottom and disposed in spaced relation to one another adjacent said peripheral edges of said false bottom and between two of said space barriers,

each of said swinging arms having a handle attached thereto whereby a player can rotate said handles thereby swinging a said arm to project said marbles or to prevent said marbles projected by another player toward a particular player from going into a said pocket adjacent said swinging arms,

said second ends of said swingable arms being adapted to swing substantially close to said third straight side of said spaced barriers when said swingable arms are swung outwardly.

4,998,730

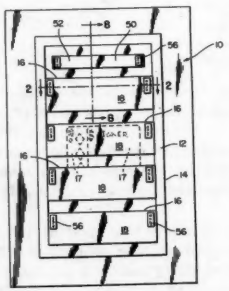
CARD POCKET EQUIPPED CARD GAME PLAYING PANEL

Raymond D. Caravaty, 534 West St., Pittsfield, Mass. 01201

Filed Feb. 28, 1990, Ser. No. 486,388

Int. Cl.[5] A63F *1/10*

U.S. Cl. 273—148 A **15 Claims**



1. A card pocket equipped card game playing panel, said panel comprising a stiff panel defining at least one predetermined area thereof for supporting cards on said panel, an elongated, flat, stiff strip member including opposite longitudinal side faces, opposite longitudinal side edges and opposite

transverse end edges, an elongated flexible decorative sheet of a width extending between side edges of said sheet at least substantially equal to the length of said strip member, one end portion of said sheet being anchored to and extending lengthwise along a first side face of said strip member and with said sheet lengthwise encircled transversely about said strip member first over one of said side edges, thereafter across said second side face, thereafter over the other of said side edges and then over said first side face with the other end portion of said sheet extending appreciably outwardly of said wrapped one side edge, the side of at least said other end portion of said sheet corresponding to the side of said sheet opposing said strip member being placed upon said area and adhered thereto, the side edges of said other end portion of said sheet adhered to said area having narrow, elongated strips disposed thereover and extending lengthwise therealong with said narrow strips spaced from said one side edge and the terminal end of said other end portion of said sheet, said wrapped strip member being folded, using said other end portion of said sheet adjacent said one side edge as a hinge, back over said narrow strips, said folded wrapped strip member and narrow strips being anchored to said narrow strips and said other end portion of said sheet, respectively, and a second elongated strip member overlying, secured to and extending transversely across said other end portion of said sheet and generally paralleling and laterally spaced outward from said other side edge of the first mentioned strip member.

4,998,731

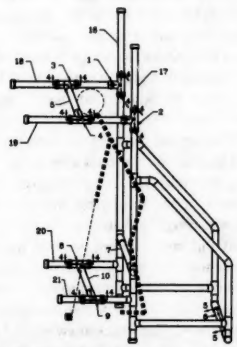
GOLF PUTTING AND SWING AID FOR PRACTICE

John H. Bowen, 2705 Kay St., Eu Claire, Wis. 54701

Filed May 14, 1990, Ser. No. 523,028

Int. Cl.[5] A63B *69/36*

U.S. Cl. 273—183 B **2 Claims**



1. A golf club swing training apparatus comprising:

a frame having first and second spaced apart vertically extending bar members having forward and rearward sides;

a paid of upper horizontal forwardly extending spaced apart bar members;

means adjustably attaching one end of each of said upper horizontal members to said vertical members adjacent the upper end of a respective vertical member;

said upper horizontal members having a horizontal head rest bar extending therebetween, said bar having means adjustably attaching its ends to said upper horizontal members;

a leg rest bar extending between and attached to said vertical bar members adjacent the lower end thereof and; means extending rearwardly of said frame for supporting said frame on a supporting surface;

whereby when a golfer is positioned adjacent to the frame, with the golfer's forehead touching the head rest bar and the golfer's knees flexed and touching the leg rest bar, the golfer will be properly positioned to practice various golf strokes.

4,998,732

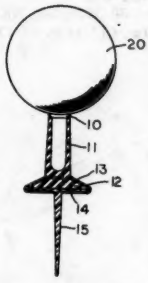
GOLF TEE

Thomas M. Gallant, 333 N. Vermont, Glendora, Calif. 91740

Filed Nov. 15, 1989, Ser. No. 436,681

Int. Cl.[5] A63B *57/00*

U.S. Cl. 273—212 **6 Claims**



1. A golf tee for supporting a golf ball at a predetermined height above a playing surface comprising, a vertically tapering extending cylindrical ball support shaft having a ball support recess at its upper end and an outwardly and downwardly extending flange at its lower end, said flange having a planar lower surface, an elongated ground engaging spike having a lower pointed end for penetrating a playing surface and a planar disc shaped member attached to its upper end. A retainer ring, said retainer ring having a central opening wherein, said shaft being coaxially received in said opening such that said retainer ring rests against said flange at said shaft lower end, said retainer ring conforming to said flange and having a portion extending outwardly beyond the peripheral edge of said flange and conforming, to the outwardly and downwardly configuration of said flange, said planar lower surface and a surface of said planar disc being engaged along a planar surface such that said ground engaging spike is coaxial with said ball support shaft, said extending portion of said retainer ring being folded around the edges of said flange and said disc shaped member to thereby rigidly connect said support shaft to said ground engaging spike.

4,998,733

GOLF BALL

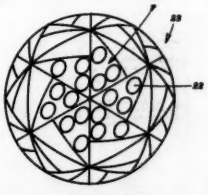
Kyou Sang Lee, Seoul, Rep. of Korea, assignor to Heubg-Ah Tire & Rubber Co., Ltd., Kinhae, Rep. of Korea

Filed Apr. 4, 1990, Ser. No. 506,700

Claims priority, application Rep. of Korea, Aug. 10, 1989, 11359

Int. Cl.[5] A63B *37/14*

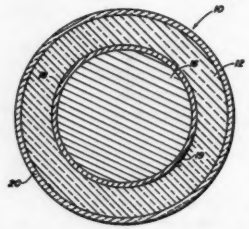
U.S. Cl. 273—232 **1 Claim**



1. A golf ball having a spherical surface with a plurality of dimples formed therein, such dimples being arranged with fifteen axes of symmetry by dividing the spherical surface into ten spherical regular hexagons corresponding to the faces of a

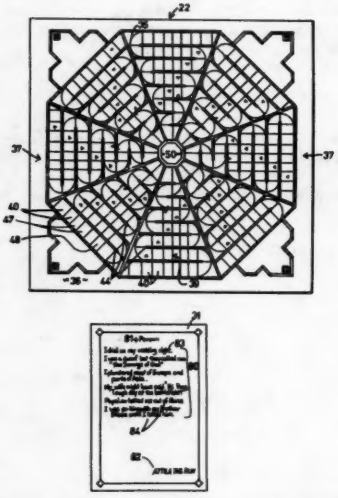
regular decahedron, further dividing each of the said spherical regular hexagons into six regular triangles, and subdividing each of the said triangles into two right-angled triangles, so that all right-angled triangles form a PHC (Propellant Hexagon Configuration).

4,996,734
GOLF BALL
David P. Meyer, Glendale, Ariz., assignor to Universal Golf Supply, Inc., Phoenix, Ariz.
Filed Nov. 30, 1989, Ser. No. 444,016
Int. Cl.[5] A63B *37/12*
U.S. Cl. 273—235 R **12 Claims**



1. A golf ball comprising a core and a transparent cover, and a layer interdisposed therebetween and enclosing at least a substantial portion of said core said layer including a portion thereof indicia for identification of said golf ball.

4,998,735
BOARD GAME
George L. Blackwell, III, Pine Bluff, Ark., assignor to Mind-Games, Inc., Pine Bluff, Ark.
Filed Dec. 18, 1989, Ser. No. 455,974
Int. Cl.[5] A63F *3/00, 9/18*
U.S. Cl. 273—249 **1 Claim**



1. A board game for two or more players, said game comprising:

a game piece for each player;

a plurality of clue cards to be utilized by the players to play the game, each clue card comprising:

a category comprising a person, place, thing, or event;

a correct and desired answer for the players to discern, each answer classified within said category; and,

a plurality of clue statements to be sequentially read to the players by a player designated as a card reader for suggesting said correct and desired answer to said players, said statements arranged in order by difficulty on said cards, so that the first-listed statement provides the least amount of specific information from which said correct and desired answer may be discerned, and the latter-listed statements provide increasingly more specific information for indicating said correct and desired answer;

a plurality of venture cards for randomly affecting the movement of said game pieces;

a game board adapted to be disposed upon a supporting surface for receiving said game pieces, said clue cards, and said venture cards, said game board comprising:

a plurality of adjacent, generally radially spaced apart playing areas, one for each player, wherein each of said player's game pieces moves within one of said plurality of playing areas;

distinctive border means for separating said playing areas from one another so that said game pieces do not advance into adjacent playing areas; and,

a winning position defined in the center of said game board, said winning position bordering each of said playing areas;

wherein each of said plurality of playing areas comprises:

a starting position;

a multi-space, serpentine path to be traveled by said players' game piece and interconnecting said starting position with said winning position;

a plurality of venture markings defined within said path for indicating to a player whose piece lands on one of said venture markings that one of said plurality of venture cards must be played;

randomly dispersed means for requiring that a player's game piece be moved backwards;

means on said path for defining a free guess zone said free guess zone occupying the plurality of spaces extending roughly halfway between said starting position and said winning position for indicating to a player whose piece is within that zone that he may offer two incorrect answers to each statement read to him from said clue cards before being penalized for each additional incorrect answer;

means on said path for defining penalty zone said penalty zone occupying the remaining plurality of spaces extending between said free guess zone and said winning position for indicating to a player whose piece lands on said penalty zone that after one incorrect response to a statement read to him from said clue cards he must move his piece backwards one space, whereby advancement on said game board is made more difficult as a player nears said winning position; and,

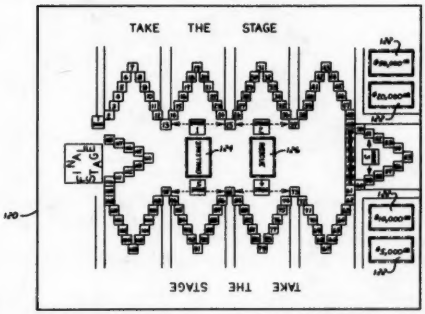
rule means for determining game piece movement such that each player may move his piece a predetermined number of spaces established by said rule means for each correct and desired answer discerned by said player in response to the reading of said clue statements, and wherein the reading of each additional clue statement results in the reduction of the number of spaces to be advanced by said player's game piece.

4,998,736

METHOD OF PLAYING A QUESTION AND ANSWER BOARD GAME

R. Brent Elrod, 2020 Tenth St. North, St. Petersburg, Fla. 33704

Continuation of Ser. No. 399,306, Aug. 28, 1989. This application Jul. 23, 1990, Ser. No. 556,832
Int. Cl.[5] A63F *3/00*
U.S. Cl. 273—249 5 Claims



1. A method of playing a board game comprising:

(a) providing a playing board having multiple contiguous playing spaces, with multiple stage spaces interspersed between playing spaces, a starting space and a final stage space;

(b) selecting the order in which a player will move by the throw of a pair of dice;

(c) providing each player with a quantity of play money;

(d) providing a player marker of different color for each player;

(e) providing written instructions to the player in each playing space on which a player lands;

(f) each player beginning play from the start space by a throw of the dice and moving in a generally clockwise manner around the board;

(g) providing Challenge cards and Rescue cards on the board; wherein some of the cards have questions and instructions requiring a player to move to a stage space and answer a question while on the stage space;

(h) providing play money to each player at the start of the game;

(i) providing band member pieces for insertion into a player's marker;

(j) each player at the beginning of a turn, naming a band or musical artist aloud and then rolling the dice and moving his marker forward the number of spaces shown on the dice, the player being able to substitute a Rescue card if he cannot name a band or musical artist;

(k) the player performing in the manner described in the space in which his marker lands and drawing either the Challenge or the Rescue card to conclude the turn;

(l) all following players beginning their turn by naming a band or musical artist whose first word begins with the last letter of the band or musical artist named by the preceding player, the player playing a Rescue card in his possession if he is unable to name a band or musical artist with the required first letter;

(m) the player adding or subtracting band members from his marker as directed by the play of the game;

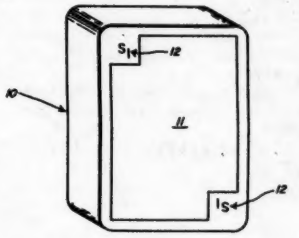
(n) the game ending when all the players remaining in the game reach the final stage, the player amassing the most money being declared the winner.

4,998,737

TWO-SIDED PLAYING PIECE GAME SET

Stewart M. Lamle, 505 E. 79th St., New York, N.Y. 10021

Filed Aug. 23, 1989, Ser. No. 398,172
Int. Cl.[5] A63F *1/00*
U.S. Cl. 273—296 8 Claims



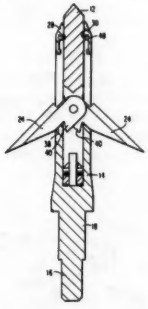
1. A game set comprising a plurality of individual pieces having game playing indicia on first and second opposite sides thereof to form an indicia combination, where N forms of indicia are used on the pieces of the game set and N is equal to or greater than 3, wherein each of the possible indicia combinations using the N forms of indicia occur twice in the game set except for twin indicia combinations in which the indicia on both sides of the game piece is the same, each twin indicia combination of the N forms of indicia occurring once in the game set.

4,998,738

BROADHEAD HUNTING ARROW

Riley Puckett, Lorton, Va., assignor to Pucketts Bloodtrailer Broadhead, Inc., Lorton, Va.

Filed Jan. 3, 1990, Ser. No. 460,299
Int. Cl.[5] F42B *6/02*
U.S. Cl. 273—421 17 Claims



7. A broadhead, comprising:

a body attachable to an arrow shaft, said body being immoveable relative to an arrow shaft once said body is attached to an arrow shaft;

a plunger slidable in a bore in said body;

means for alternatively holding said plunger in a first or second position relative to said body;

two pairs of cutting blades connected by pivot pins to said plunger, a first pair of cutting blades connected at a first location on said plunger, a second pair of cutting blades connected at a second location on said plunger;

means for holding said cutting blades in a completely retracted position within slots formed in said body when said plunger is in said first position; and

cam surfaces on said body positioned to open said first and

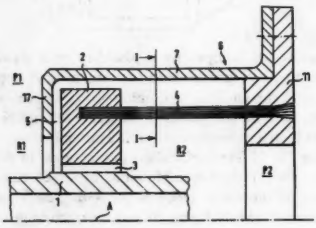
second pairs of cutting blades as said plunger moves from said first position to said second position.

4,998,739

ARRANGEMENT FOR THE SEALING-OFF OF SPACES ACTED UPON BY MEDIA OF DIFFERENT PRESSURES FOR TURBOMACHINERY AND THE LIKE

Wolfgang Weiler, Dachau, Fed. Rep. of Germany, assignor to Mtu Motoren- und Turbinen-Union Muenchen GmbH, Fed. Rep. of Germany

Filed Aug. 25, 1989, Ser. No. 398,508
Claims priority, application Fed. Rep. of Germany, Aug. 25, 1988, 3828833
Int. Cl.[5] F16J *15/16, 15/44*
U.S. Cl. 277—53 33 Claims



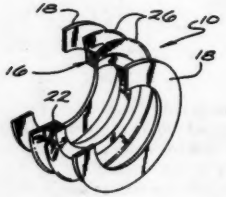
33. An arrangement for the sealing-off of two spaces acted upon by media of a different pressure, for turbo machines, in which a sealing ring is arranged in a cylindrical housing while forming a radial sealing gap as a primary seal, and having a secondary leakage flow passage between a wall section of the housing and the sealing ring which communicates with the space having the lower pressure, the sealing ring being centered by means of spaced spring elements which are anchored at the housing on one side and are arranged essentially in parallel with respect to the machine axis.

4,998,740

FACE SEAL ASSEMBLY

Gilbert F. Tellier, West Hills, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 29, 1989, Ser. No. 414,966
Int. Cl.[5] F16J *9/16*
U.S. Cl. 277—205 14 Claims



1. A face seal assembly, comprising:

a seal member having a seal base defining an axially opposed pair of side faces, and a pair of seal legs extending from said seal base generally in a common direction and defining a pair of axially outboard side surfaces as axially diverging continuations of said side faces; and

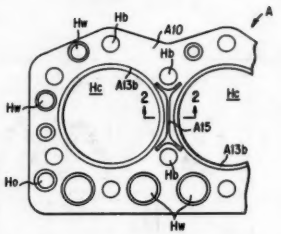
a pair of film gaskets unconnected to said seal member and having a size and shape for respectively overlying axially opposed sides of said seal member.

4,998,741

METAL PLATE WITH REINFORCING BEAD AND A CYLINDER HEAD GASKET INCLUDING THE SAME

Tsunekazu Udagawa, Ichikawa, Japan, assignor to Ishikawa Gasket Co. Ltd., Tokyo, Japan

Filed Jul. 10, 1989, Ser. No. 377,446
Claims priority, application Japan, Jul. 9, 1988, 63-91156[U]
Int. Cl.[5] F16J *15/12*
U.S. Cl. 277—235 B 8 Claims



1. A metal plate for a cylinder head gasket adapted to be installed in an internal combustion engine having a plurality of cylinder holes therein, comprising:

a plurality of first holes corresponding to the cylinder holes of the engine,

a sealing bead formed around each first hole,

at least one dividing area located between the respective sealing beads of adjacent first holes, and having a longitudinal extent which defines the longest linear dimension of said dividing area, said dividing area receiving high heat and pressure due to combustion of gas in the cylinder holes when the engine is operated, and

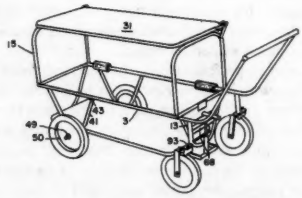
at least one reinforcing bead situated in the dividing area, said reinforcing bead having an elongated, substantially straight portion extending substantially inside the dividing area along the direction of said longitudinal extent at a predetermined distance away from the respective sealing beads adjacent the first holes to strengthen the dividing area, said reinforcing bead preventing creep relaxation of the metal plate at the dividing area created by high heat and pressure due to combustion of gas in the cylinder holes, and forming, when the metal plate is compressed, a plurality of corrugated beads to tightly seal between the adjacent cylinder holes.

4,998,742

MULTI-PURPOSE PORTABLE WORKBENCH CART

Arthur W. Maynard, 4608 Hickory St., Pascagoula, Miss. 39567

Filed Mar. 31, 1989, Ser. No. 330,892
Int. Cl.[5] B62B *3/02*
U.S. Cl. 280—35 8 Claims



1. A utility cart comprising first and second side members extending horizontally from the rear of the cart to the front of the cart along first and second sides, a handle connected to forward ends of the side members and extending upwardly and forwardly therefrom, first and second cross members extending transversely between the side members at the rear of the cart and at the front of the cart respectively, the cross members

having ends joined to the side members at intersections of the cross members and side members, first and second upright members extending upward from intersections of the cross members to an upper extremity and then extending parallel to the cross members at positions spaced therefrom, thereby forming generally rectangular U-shaped members, first and second hinges connected to the upright members near an upper extremity thereof at positions spaced upward from one of the side members, a work table having a generally rectangular shape and having dimensions generally similar to dimensions of the cross members and the side members between the cross members, the table having connections to the hinge means adjacent corners of the table whereby the table may be positioned along one side of the utility cart in a lowered position and may be positioned across the upper support members in a second operative position of the table, first and second truss members extending downward from the first and second side members respectively at positions near the first end of the cart, a first axle member connected to bottom portions of the first and second truss members and extending transversely across the cart, first and second wheels having first and second wheel axle members connected to the fixed axle member, further comprising a rear truss member and a forward truss member having upper ends respectively connected to the first and second cross members and extending downward therefrom, a bottom shelf positioned above the fixed axle member and extending between the rear and front truss members, rear and front connections for respectively connecting lower portions of the rear and front truss members to rear and front edges respectively of the bottom shelf, the bottom shelf having side edges positioned within lower portions of the first and second and side truss members, the bottom shelf being fixed above the first axle member and between the truss members for supporting loads on the bottom shelf.

4,998,743

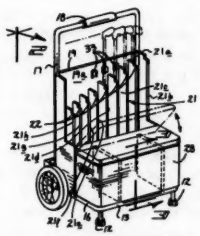
GOLF CART

Michael J. Thielen, 5708 N. Ansbrook Pl., Tucson, Ariz. 85741

Filed Nov. 6, 1989, Ser. No. 432,370

Int. Cl.[5] B62B *1/02*

U.S. Cl. 280—47.26 **1 Claim**



1. A golf cart comprising, in combination,

a framework including a forward bar spaced and parallel to a rear bar, and

spaced parallel side bars, and

a plurality of wheels rotatably mounted to an axle underlying and orthogonally directed relative to the side bars, and

a central support plate of a width equal to a first distance fixedly mounted between the side bars including a rear plate surface and a forward plate surface, and

a "U" shaped handle orthogonally mounted to the side bars and extending upwardly therefrom and overlying the central support plate, and

a first series of compartments formed to and extending forwardly of the forward plate surface, and

a second series of compartments formed to and extending rearwardly of the rear plate surface and extending to the rear bar, and

a storage chest including a rear wall removably mounted adjacent the first series of compartments and extending to the forward bar, and

the central support plate is fixedly secured to a forward surface of the "U" shaped handle, and

wherein the first series of compartments are defined between the "L" shaped plates fixedly and orthogonally secured to and extending forwardly of the forward surface with a series of divider plates equally spaced between the "L" shaped plates wherein the divider plates are of gradually increasing height not to exceed a height defined by the central support plate, and each divider plate includes a designation plate formed to an upper forward surface of each divider plate providing information regarding a respective golf club positioned forwardly of each divider plate, and each "L" shaped plate includes a lowermost surface mounted coextensively to the rear wall of the storage chest, and

wherein the second series of compartments is defined by a plural series of compartment pairs, and each compartment of the compartment pairs is aligned with an overlying aperture, each aperture defined by a plurality of resilient fingers defining an elongate slot therebetween to enable removal and positioning of a golf club handle within the aperture, and

wherein the storage chest is insulated and compartmentalized, and

wherein the storage chest further includes a handle formed on each end surface of the chest, and

wherein a width defined by the chest, and a further width defined by the lowermost surface of each "L" shaped plate, and yet further width defined by each compartment of each compartment pair defines a second length equal to a side bar, and

further including a "C" shaped clamp releasably mounted over an underlying surface of the forward bar with a planar leg integrally mounted to an end of the "C" shaped clamp, and a threaded fastener directed through the leg and into a bottom surface of the chest to secure the chest to the framework, and

wherein the threaded fastener includes a "T" shaped handle on an end remote from the chest and wherein the "T" shaped handle is positioned below the forward bar when threaded fastener is secured through the leg and into the chest.

4,998,744

CHILD'S SEAT

Joannes Drexler, Lijsterbeslaan 3, 6982 CL Doesburg, Netherlands

Filed Jun. 16, 1989, Ser. No. 367,077

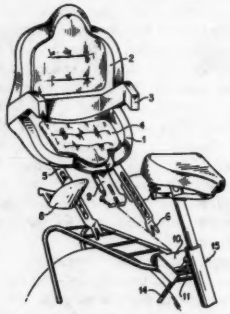
Claims priority, application Netherlands, Jun. 17, 1988, 8801549

Int. Cl.[5] B62J *11/00*

U.S. Cl. 280—202 **11 Claims**

1. In a child's seat for mounting above the rear wheel of a bicycle having a frame which includes a rear fork, wherein the seat has a seat bottom, armrests, a backrest and mounting means for attaching the seat to the bicycle frame, the improvement comprising (1) an attachment means connected to said seat bottom and having a forward extension which extends forwardly therefrom and terminates with an attachment end, a first clamping means attached to the rear fork of the bicycle at a vertical position above said rear wheel, said attachment end and said first clamping means having complementary configurations such that upon insertion of the attachment end into said first clamping means the attachment end may be pivoted about a transverse axis of said clamping means from an insertion position to a secured position, and (2) a substantially U-shaped bracket with the U-end thereof rotatably attached to the seat bottom and the two legs thereof spinning said rear wheel and extending from said seat bottom to near the rear fork at a vertical position thereof below the top of the rear wheel with each of said two legs terminating in fork elements, and wherein

a second clamping means is attached to a fork leg of the rear fork and being configured such as to receive said fork elements and lock and unlock said fork elements in said second clamping



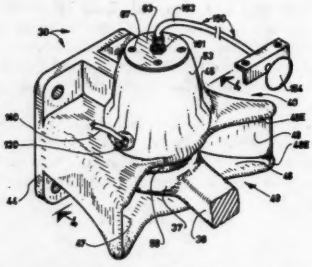
means with only digital manipulation thereof, whereby said seat may be mounted or removed from the bicycle without the use of tools.

4,998,745

SAFETY QUICK HITCH

John David, Apt. 1, 542 E. 600 North, Spanish Fork, Utah 84660

Filed Nov. 9, 1989, Ser. No. 433,797
Int. Cl.[5] B60D *1/26*
U.S. Cl. 280—508 **15 Claims**



1. A hitch assembly for automatically coupling a utility trailer to a conventional tow vehicle such as a tractor, said trailer having a drawbar equipped with a gudgeon, said assembly comprising:

housing means for securing said assembly to said tow vehicle;

mouth means defined within said housing means for receiving said gudgeon, said mouth means comprising outwardly diverging guide wall means for automatically, properly centering said gudgeon for coupling;

a throat defined within said housing in communication with said mouth;

an internal bore vertically defined within said housing means, said bore perpendicularly intersecting said mouth means;

piston means slidably disposed within said bore for penetrating said gudgeon and thus locking said drawbar within said mouth, said piston means selectively displaceable between a clearance position unobstructing said mouth and a deployed position penetrating said mouth and capturing said gudgeon;

a trigger assembly slidably disposed within said throat adjacent said bore for actuating said piston means in response to deflection by said gudgeon to a predetermined depth, said trigger assembly comprising:

a rigid trigger block slidably disposed within said throat, said trigger block comprising an arcuate, generally concave front face conformed to receive said gudgeon, a rear wall defining a notch, a bottom, and a top, said top comprising an elongated follower slot;

a rigid retainer slidably disposed upon said trigger block for engaging said piston means in its clearance position, said retainer comprising a downwardly extending follower projecting into said follower slot;

spring means associated with said follower for biasing said retainer; mechanical switch means associated with said notch for linking said trigger block to an external control panel;

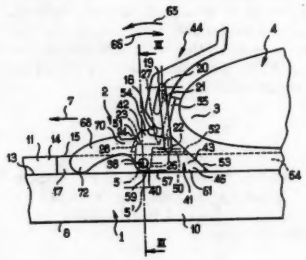
whereby said gudgeon entering said mouth physically contacts said trigger block face and deflects said trigger block backwardly into said throat to said predetermined depth and said trigger block deflects said retainer out of engagement with said piston.

4,998,746

SKI BINDING HAVING INTEGRAL BIASING AND SUPPORT MEMBERS

Paul Arnulf, Alby Sur Cheran, France, assignor to Salomon S.A., Annecy Cedex, France

Continuation of Ser. No. 51,393, May 19, 1987, abandoned. This application Mar. 15, 1989, Ser. No. 325,009
Claims priority, application France, May 21, 1986, 8607229
Int. Cl.[5] A63C *9/20*
U.S. Cl. 280—615 **39 Claims**



1. An apparatus for linking a boot to a ski comprising:

(a) a support, formed at least partially from elastic, flexible material, having a longitudinal axis and a transverse axis, said support having a central portion and lateral sections provided with a cylindrical passage with a longitudinal axis coincident with said transverse axis and being adapted to be mounted to a surface on said ski for pivoting about said transverse axis, said central portion having a bottom surface and said lateral sections having lower surfaces located below said bottom surface for contact with said surface on said ski, wherein said central portion and said lateral sections define an open area adapted to mate with a raised area on said surface of said ski;

(b) means for biasing at least a portion of said support against said surface, said means for biasing being formed at least partially from elastic, flexible material, being unitary with said support, and being connected to one end of said support, said means for biasing further having an arched underside and an end portion opposite the end connected to said support for contacting said surface on the ski;

(c) means for attachment to said boot including:

(i) an element for attachment to said boot; and

(ii) a pivot portion through which said transverse axis extends, said pivot portion being unitary with said element, being at least partially embedded within said support, and having an extension defining a circular area having a center coincident with said transverse axis; and

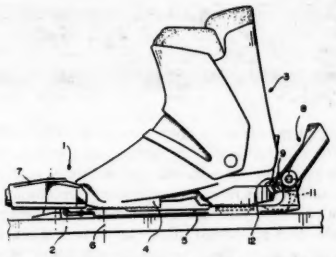
(d) a journal extending through said cylindrical passage and said circular area.

4,998,747

MODIFIED UNIVERSAL SKI BINDING FOR USE WITH DIFFERENT SKI BOOTS, AND BOOTS SPECIFIC TO CERTAIN BINDINGS

Jean-Pierre Dimier, Rumilly, and Roger Pascal, Annecy Le Vieux, both of France, assignors to Salomon S.A., Annecy Cedex, France

Continuation of Ser. No. 690,882, Jan. 14, 1985, Pat. No. 4,746,139. This application Aug. 3, 1987, Ser. No. 81,034
Claims priority, application France, Jan. 12, 1984, 84 00390
The portion of the term of this patent subsequent to May 24, 2005, has been disclaimed.
Int. Cl.[5] A63C *9/084*
U.S. Cl. 280—631 **90 Claims**



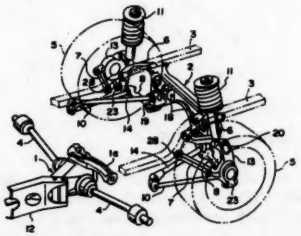
1. A ski boot comprising standard retention and free zones at at least one of its ends to allow for the insertion of the boot into a binding adapted to secure a boot having standardized retention and free zones on at least one of its ends onto a ski, wherein said boot further comprises blocking means for preventing said boot from being secured to said binding by said blocking means, wherein said blocking means prevents said boot from being secured in bindings lacking means for receiving said blocking means, wherein said boot includes means in addition to said blocking means for laterally retaining said boot in said binding which includes standardized retention and free zones and which includes means for receiving said blocking means, and wherein said blocking means is a projection molded onto the sole of said boot.

4,998,748

VEHICLE SUSPENSION SYSTEM

Akihiro Kashiwagi, and Takao Kijima, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Apr. 3, 1990, Ser. No. 503,860
Claims priority, application Japan, Apr. 4, 1989, 1-86667
Int. Cl.[5] B60G *3/00*
U.S. Cl. 280—690 **19 Claims**



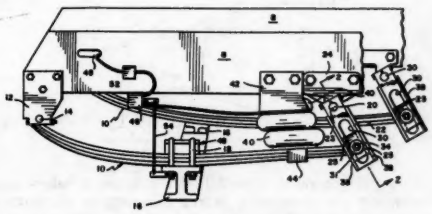
1. A suspension system for a vehicle comprising a driving wheel support means which supports for rotation a driving wheel of the vehicle, and a wheel guide means which includes a plurality of arm members each of which is connected to the driving wheel support means at its outer end and to the vehicle body at its inner end, and restrains the toe angle of the driving wheel, characterized in that said wheel guide means is arranged to cause the driving wheel to move in the direction of toe-in when a rearward load acts on the driving wheel and the driving wheel is displaced rearward, and includes a resilient support means and a toe-out restraining means, the resilient support means resiliently supporting the driving wheel support means relative to the vehicle body and being arranged to contract when an external force acts thereon in a certain direction and to expand when an external force acts thereon in the reverse direction so that the driving wheel moves in the direction of toe-in when a forward driving force acts on the driving wheel, and when a rearward load acts on the driving wheel while a forward driving force is acting on the driving wheel, the toe-out restraining means restraining the resilient support means from abruptly displacing the driving wheel in the direction of toe-out while permitting the resilient support means to slowly displace the driving wheel in the direction of toe-out.

4,998,749

SUSPENSION FOR SMOOTH RIDE WITH GOOD HANDLING CONTROL OF HEAVY LOAD VEHICLES

Leland Bockewitz, P.O. Box 487, Morrisonville, Ill. 62546

Filed May 25, 1989, Ser. No. 356,732
Int. Cl.[5] B60G *11/46*; F16F *1/26*
U.S. Cl. 280—712 **5 Claims**



1. An improved air spring suspension system for a wheeled vehicle including a frame, first and second leaf springs each including a front end and a rear end, the front end of said first and second leaf springs being secured to first and second brackets, respectively, which are secured to opposite sides of said frame, each of said first and second leaf springs being secured to a front axle approximately at a mid-point of each of said leaf springs between their front end and their rear end, an air pressure source, an adjustable air pressure regulator secured to a pressure line from said air pressure source, an air control height leveling valve connected with said air pressure regulator on the same side of said vehicle, and a third and fourth bracket connected to each side of the frame for connecting a rear end of said first and second leaf springs, the improvement including;

a first and second pair of slotted stabilizer links secured at one end to each of said third and fourth brackets on each side of the frame for securing the rear end of each of said first and second springs with said frame, each of said stabilizer links having a somewhat U-shaped channel in cross-section with edge supports (38) that extend along their entire length;

a first and second bolt that secures the rear end of each of said first and second leaf springs to said first and second pairs of slotted stabilizer links;

a self locking nut for each of said first and second bolts;

an inner and an outer slide pad on each of said first and second bolts on each side surface of each of said slotted stabilizer links of each of said first and second pairs of slotted stabilizer links, each of said inner and outer slide pads are rectangular in shape and slide along and within said edge supports (38) of said U-shaped stabilizer links;

an air-spring on each side of said frame;

an upper bracket secured to said frame at an upper end of each of said air-springs;

a lower bracket at a lower end of each of said air springs secured to said leaf spring;

said upper and lower brackets being positioned to secure each of said air springs juxtaposed said first and second pair of slotted stabilizer links, and

said air-springs are connected to one each of said air control leveling valves.

4,998,750

GAS GENERATOR ESPECIALLY FOR INFLATING A SAFETY BAG

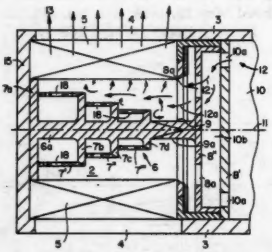
Bernd Werner, Schliersee, and Harald Voggenreiter, Neubiberg, both of Fed. Rep. of Germany, assignors to Bayern-chemie Gesellschaft fuer Flugchemisch Antriebe mbH, Aschau am Inn, Fed. Rep. of Germany

Filed Oct. 13, 1989, Ser. No. 421,552

Claims priority, application Fed. Rep. of Germany, Oct. 13, 1988, 3834892

Int. Cl.[5] B60R *21/26*

U.S. Cl. 280—740 **21 Claims**



1. A gas generator, especially for inflating a safety bag, comprising gas generating means including a combustion chamber for producing a gas for said inflating, a filter housing connected to said combustion chamber, means for passing gas produced in said combustion chamber into said filter housing in a first axial direction, ring filter means having a given filter volume and a central cavity located in said filter housing, so that produced gas enters into said central cavity, said filter housing having a housing wall with radially facing gas exit means in said housing wall, so that gas entering said cavity in said first axial direction must pass through said ring filter means and out through said gas exit means in a second radial direction, and axially effective gas flow distribution means in said cavity for substantially uniformly distributing axially inflowing gas over a ring filter surface facing said cavity, said gas flow distribution means comprising a plurality of gas flow influencing elements for converting an axial gas inflow into a radial turbulent gas outflow which is substantially uniformly distributed onto said ring filter surface for efficiently using substantially all of said given filter volume of said ring filter means.

4,998,751

TWO-STAGE AUTOMOTIVE GAS BAG INFLATOR USING IGNITER MATERIAL TO DELAY SECOND STAGE IGNITION

Donald B. Paxton, Brigham City; Donald R. Lauritzen, Hyrum, and Scott R. Anderson, Syracuse, all of Utah, assignors to Morton International, Inc., Chicago, Ill.

Filed Mar. 26, 1990, Ser. No. 498,787

Int. Cl.[5] B60R *21/10*

U.S. Cl. 280—741 **20 Claims**

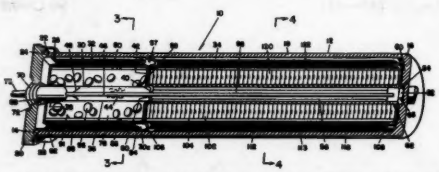
1. An inflator comprising:

an elongated housing,

a bulkhead located in said housing at an intermediate position along the length thereof, said bulkhead having a perforation therein,

a pyrotechnic gas generator contained within said housing comprised of first and second gas generating charges extending in end-to-end relation therein with one of said charges being located on one side of said bulkhead and the other charge being located on the other side thereof, and

initiator means in said housing comprising first and second igniter tubes associated, respectively, with said first and second gas generating charges for effecting ignition thereof, each of said igniter tubes having a common longitudinal axis and containing igniter material therein with the igniter material contained in said second igniter tube



being characterized to burn at a rate different from the igniter material in the first igniting tube, and an elongated fuse extending through the perforation in said bulkhead and said igniter tubes and positioned substantially coincident with the common longitudinal axis thereof, and a single squib positioned adjacent a portion of said fuse, and operative when fired, to initiate activation of said fuse thereby to effect substantially simultaneous ignition of the igniter material contained in each of said first and second igniter tubes.

4,998,752

CUSTOMIZED TRIP PLANNER

Nancy L. Judson, 30 Park Ave., Suite 50, New York, N.Y. 10016

Continuation of Ser. No. 240,685, Sep. 6, 1988, abandoned. This application Jan. 12, 1990, Ser. No. 464,705

Int. Cl.[5] G09B *29/00, 29/10, 29/12;* B02F *21/00*

U.S. Cl. 283—34 **6 Claims**

1. A planner which comprises

(a) a base map having a definitive area outline;

(b) a plurality of transparent sheets each having an annotated outline of the base map printed thereon wherein each said annotated outline depicts the locations of a travel planning interest;

(c) each annotated outline being the exact size of the definitive area outline of the base map;

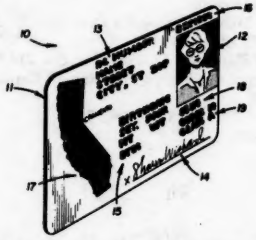
(d) means for attachment of a plurality of transparent sheets over the base map such that the annotated outlines of the transparent sheets correspond exactly with the definitive area outline of the base map.

4,998,753

MULTI-PURPOSE COMPUTER READABLE DRIVER'S LICENSE

Sharon Wichael, 656 Juana, San Leandro, Calif. 94577

Filed Apr. 3, 1990, Ser. No. 503,820
Int. Cl.[5] B42D 15/00
U.S. Cl. 283—82 6 Claims



1. A multi-purpose computer readable driver's license comprising

a rigid plastic card having front and back sides,

photographic indicia means on the front side of said card for depicting the person-owner of said driver's license,

identification indicia means on the front side of said card for visually identifying the person-owner by at least his/her driver's license number, name, and address,

signature indicia means on one of the front and back sides of said card for visually displaying the signature of the person-owner,

machine and computer readable magnetic tape means secured on one of the front and back sides of said card with additional pertinent information relating to the person-owner being stored on said tape means, and

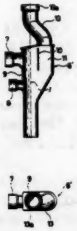
code indicia means on the front side of said card for depicting the class of classes of said additional pertinent information stored and available by use of said magnetic tape means, including information directly pertinent to the person-owner as a driver of a motor vehicle and/or information directly pertinent to the person-owner's financial and credit status.

4,998,754

DRAINPIPE JOINT

Shigeyuki Matsumoto, Ibaraki, and Tomoyoshi Kawamura, Saitama, both of Japan, assignors to Benkan Corporation, Japan

Filed Nov. 16, 1989, Ser. No. 437,265
Claims priority, application Japan, Nov. 18, 1988, 63-150661
Int. Cl.[5] F16L 41/00
U.S. Cl. 285—150 2 Claims



1. In a vent-free single-duct drainage piping system for vertical installation in multi-storied buildings, a joint for interconnecting vertical pipe sections of the drainage piping system comprising:

an upper pipe portion having at an upper end thereof an inlet port adapted for connection to a lower end of an upstream side pipe section of the drainage piping system to receive drain coming down through the upstream side pipe section,

the upper pipe portion having a helical configuration so as to define a spiral axis along a longitudinal length thereof between the inlet port and an outlet port defined at a lower end of the upper pipe portion,

a substantially straight lower pipe connected to the outlet port of the upper pipe portion and having at a side thereof a multiplicity of side ports adapted for connection to horizontal drainage pipes laid on a floor of the building to receive drain from the horizontal drainage pipes,

the straight lower pipe portion having at a lower end thereof an outlet port adapted for connection to an upper end of a downstream side pipe section of the drainage piping system to pass both the drain from the upper pipe portion and the drain from the side ports down into the downstream side pipe section,

a vertical partition mounted inside the lower pipe portion between the outlet port of the lower pipe portion to define a first passage provided for direct fluid flow relationship with the upper pipe portion and a second passage provided for direct fluid flow relationship with the side ports, and

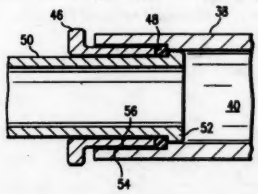
the upper pipe portion having an upper part thereof axially aligned with the second passage of the lower pipe portion.

4,998,755

SPRINKLER PIVOT JOINT

Gary M. Reeder, 9228 Cherokee Trail, Flower Mound, Tex. 75028

Filed Sep. 7, 1989, Ser. No. 404,259
Int. Cl.[5] F16L 43/00
U.S. Cl. 285—181 4 Claims



1. A pivoting sprinkler assembly, comprising;

a Tee member for inserting in an irrigation pipe and having a first end and a second end in series for being inserted in line with said pipe, and a third end being attached to the sprinkler assembly;

first, second and third elbows, said first elbow having first and second pivoting ends, said second elbow having first and second fixed ends and said third elbow having a pivoting end and a fixed end;

a first length of pipe disposed between the third opening in said Tee and the first pivoting end of said first elbow, said first length of pipe and said Tee being essentially in the same plane as said irrigation pipe;

a second length of pipe disposed between the second pivoting end of said first elbow and the first fixed end of said second elbow and generally having the longitudinal axis thereof directed upward from the plane of said irrigation pipe;

a third length of pipe having one end thereof fixedly attached to the second fixed end of said second elbow and the other end thereof pivotally attached to the pivoting end of said third pivoting elbow, said second length of pipe generally disposed in a plane parallel to the plane of said irrigation pipe; and

a sprinkler head for being disposed in the fixed end of said

third pivoting elbow and directed upward from the plane of said third length of pipe;

each of the pivoting ends of said first and third pivoting elbows comprising:

an elbow housing having a generally circular bore with a substantially 90° bend in the center thereof and both ends thereof being open;

a first seal for sealing one of the openings in said housing to the end of a length of pipes;

the other opening of said housing comprising the pivoting opening for receiving the end of a length of pipe and having a larger inner diameter than the outer diameter of the received end of the pipe;

a rim disposed on the received end of the pipe when the received end of the pipe is disposed in the housing through said pivoting opening, said rim having an effective outer diameter slightly less than the inner diameter of said pivoting opening;

a stop disposed on the inner wall of said pivoting opening between the outermost edges thereof relative to said housing and said rim, when said rim and the received end of the pipe are disposed in said pivoting opening, said stop having an effective inner diameter that is slightly larger than the outer diameter of the received end of the pipe; and

an O-ring disposed about the outer surface of the received end of the pipe at a point interior to said housing relative to said stop and providing a seal between the outer surface of the received end of the pipe and the inner surface of said housing.

4,998,756

ADJUSTABLE CONNECTION APPARATUS

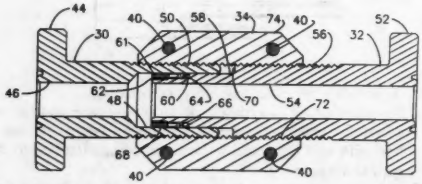
Brian Hart, Wakefield, England, assignor to Cooper Industries, Inc., Houston, Tex.

Filed Nov. 30, 1989, Ser. No. 443,388

Claims priority, application European Pat. Off., Sep. 14, 1989, 89309339.3

Int. Cl.[5] F16L *27/12*

U.S. Cl. 285—298 **4 Claims**



1. An adjustable length connection apparatus comprising

a first tubular member having a central bore, a counterbore extending axially therein for a preselected distance at one end thereof, means for connecting the first tubular member into a flowline at the opposite end from said one end and external grooves and ridges,

a second tubular member having a central bore, a first reduced outer diameter at one end thereof and a second reduced outer diameter extending from the end of said first reduced outer diameter and having a diameter smaller than the diameter of said counterbore of said first tubular member, means for connecting the second tubular member into a flowline at the opposite end from said one end and external grooves and ridges,

a pair of mating clamping sections having internal grooves and ridges for mating with the external grooves and ridges on said first and second tubular members and means for joining the clamping sections into tight engagement with the exterior of said first and second tubular members, and sealing means positioned between the exterior of said first reduced diameter of said second tubular member and the interior of said counterbore of the first tubular member.

4,998,757

BAR ENCLOSURE FOR SHEET METAL CABINET DOORS

Dieter Ramsauer, Am Neuhauskothen 20, D-5620 Velbert 11, Fed. Rep. of Germany

PCT No. PCT/DE87/00413, § 371 Date May 25, 1988, § 102(e) Date May 25, 1988

PCT Filed Sep. 12, 1987, Ser. No. 214,731

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1986, 86113173

Int. Cl.[5] E05C *9/12*

U.S. Cl. 292—39 **12 Claims**

1. A bar for installation in at least one aperture of cabinet doors, comprising a lock with a lock nut supporting a pinion, and bearing means for rotatably supporting the lock nut, at least one bar having means for engaging teeth of the pinion and being displaceable longitudinally between non-locking and locking positions, locking elements which engage each other in response to the bar being in said locking position, said locking elements being free of each other when one bar is in the non-locking position, said bearing means comprising a base part and a cap part which is connectable with the base part, said cap part cooperating with the base part to form guiding slots for the bar, means for connecting said cap part and said base part together, said bar being removable together with said lock nut from said base part immediately after disconnecting said connecting means and removing said cap part, said bar being placeable back into said base part in any one of two different relative orientations, one of said two different relative orientations enabling the bar closure to be usable for right-opening cabinet doors and the other of said two different relative orientations enabling the bar closure to be usable for left-opening cabinet doors, said cap part being thereafter refastenable to said base part by said connecting means when said bar is in any of said two different relative positions.

4,998,758

LOW EFFORT REMOTE LATCH ACTUATOR

David Kowalczyk, Sterling Heights; Ian J. Dow, Royal Oak, and Carl D. May, Farmington Hills, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 10, 1990, Ser. No. 521,855

Int. Cl.[5] E05C *3/26*

U.S. Cl. 292—201 **1 Claim**

1. An actuator for the release of a motor vehicle latch from a plurality of remote locations, comprising:

an actuator lever operatively associated with the latch for releasing the latch;

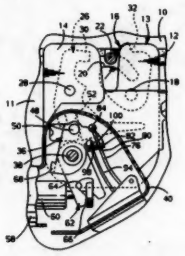
pivot means mounting the actuator lever so that pivotal movement of the actuator lever in one direction releases the latch;

an auxiliary lever mounted on the pivot means,

electric motor means connected to the auxiliary lever to

pivot the auxiliary lever in the one direction upon remote energization of the electric motor means;

abutment means acting between the levers so that pivotal movement of the auxiliary lever in the one direction by the electric motor means causes pivotal movement of the actuator lever to release the latch and pivotal movement of the actuator lever in the one direction about the pivot means permits the auxiliary lever to remain at rest so that the electric motor means is not backdriven by pivoting movement of the actuator lever;



first and second cable means independently remotely actuable,

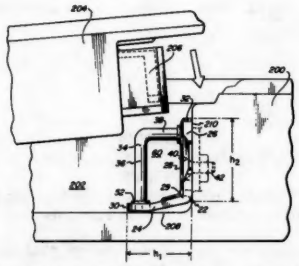
and first and second lost motion connection means respectively connecting the first and second cable means with the actuator lever by which either one of the first and second cable means may rotate the actuator lever in the one direction while the other of the cable means and the auxiliary lever coupled to the electric motor means remain at rest and are not backdriven.

4,998,759

DOOR STRIKER ASSEMBLY

Francis C. Peterson, Woodbury, Conn., and Alamantas K. Paskonis, Parma, Ohio, assignors to Buell Industries, Inc., Waterbury, Conn.

Filed Oct. 20, 1989, Ser. No. 424,521
Int. Cl.[5] E05B *15/02*
U.S. Cl. 292—340 **25 Claims**



1. A door striker assembly for a vehicle having a vehicle door and a vehicle door receiving aperture, the vehicle door being movable from an open to a closed position, and having a vehicle door latch mechanism, the vehicle door receiving aperture including two panels at an angle of substantially less than 180 degrees to each other, comprising:

an integral bracket having two sections joined together in a base area at an angle selected to permit said bracket sections to fit against and closely abut the two panels of the vehicle door aperture, the joining base area between said sections having a substantial width to provide substantial structural strength to said bracket;

means for engagement with the vehicle door latch mechanism, said engagement means extending between and being rigidly affixed to said bracket sections;

means for mounting said bracket to the vehicle door receiving aperture;

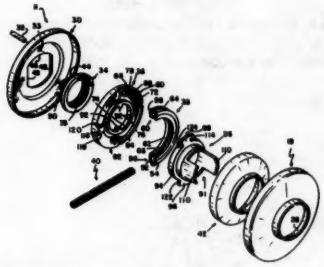
said means for engagement and said bracket forming a rigid structure.

4,998,760

DOOR HANDLE RETURN ASSEMBLY

Duane B. Nixon; Ralph P. Palmer, and Carl M. Pritchett, all of Indianapolis, Ind., assignors to Best Lock Corporation, Indianapolis, Ind.

Filed Oct. 13, 1989, Ser. No. 421,159
Int. Cl.[5] E05B *1/00*
U.S. Cl. 292—347 **25 Claims**



1. A door handle assembly for operating a latch bolt in a door, the assembly comprising

a door handle,

means for supporting the door handle for rotation about an axis between a return position and operating positions,

first return means for retracting the latch bolt in response to rotation of the door handle by an operator away from its return position and applying a force to bias the door handle to its return position, and

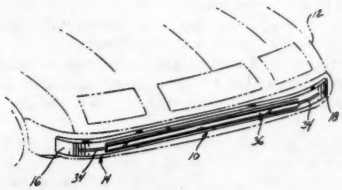
second return means surrounding the door handle for automatically rotating the door handle from an operating position to its return position in addition to the first means upon release of the door handle by the operator.

4,998,761

REINFORCED IMPACT BAR FOR A BUMPER ASSEMBLY

Dean M. Bayer; Curtis H. Harris, and Bradley A. Jones, all of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 2, 1990, Ser. No. 503,008
Int. Cl.[5] B60R *19/00*
U.S. Cl. 293—121 **5 Claims**



1. A bumper assembly for a vehicle, comprising:

(a) an elongated impact bar having

(i) an inner surface facing a vehicle,

(ii) an outer surface facing opposite the vehicle, and

(iii) a rib, integrally formed at a central portion of the impact bar, projecting outwardly from the outer surface

and extending a substantial portion of the length of the impact bar;

(b) a reinforcing member mounted on the outer surface of the impact bar and covering a substantial portion of the length of the rib;

(c) energy-absorbing means mounted on the outer surface of the impact bar and covering a substantial portion of the lengths of the reinforcing member and the rib; and

(d) fascia means attached to the vehicle and covering the energy-absorbing means.

4,998,762

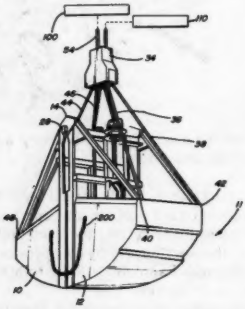
POWER BUCKET

Raymond E. Bergeron, 3452 W. Jefferson, Trenton, Mich. 48183

Continuation-in-part of Ser. No. 341,488, Apr. 20, 1989, abandoned. This application Sep. 18, 1989, Ser. No. 409,607

Int. Cl.[5] B66C *3/02*

U.S. Cl. 294—68.23 **8 Claims**



1. A bucket for loading and unloading cargo comprising:

a first bucket half and a second bucket half, each bucket half having a top, a closed bottom, a front wall and a back wall which are spaced apart from each other, a closed outside wall and an open inside end,

means for pivotally securing the tops of said bucket halves together so that said bucket halves are movable between an open position and a closed position pivoting about said means, wherein in said closed position said open ends register with each other to contain cargo within an interior of the bucket and wherein in said open position said open ends of said bucket halves are spaced apart to encompass the cargo to be loaded,

a head,

a first pair of cables, said first pair of cables being secured at one end to said head and being secured at their other ends adjacent the outside wall of one bucket half,

a second pair of cables, said second pair of cables being secured at one end to said head and being secured at their other ends adjacent the outside wall of the other bucket half, and

means for pivotally moving said bucket halves from said open to said closed position comprising a closure cable extending through said head and through a guide pulley assembly swivelably mounted to at least one bucket half about a vertical axis, said closure cable then being connected within and to each of said bucket halves below said means pivotally securing the tops of said bucket halves together,

wherein said closure cable returns through said head.

4,998,763

CARGO HOOK

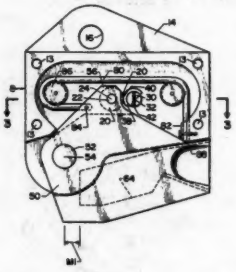
James A. Henke, 10300 Albion Road, Richmond, B.C., Canada V7A 3E4

Filed Jul. 19, 1989, Ser. No. 381,823

Claims priority, application Canada, Jul. 21, 1988, 572730

Int. Cl.[5] B66C *1/34*

U.S. Cl. 294—82.33 **6 Claims**



1. A cargo hook for releasably carrying a load, said cargo hook comprising:

(a) a support frame;

(b) a load beam releasably engaging and carrying the full weight of said load, said beam pivotally mounted between opposed sides of said frame for pivotal movement about a beam axis between a first position at which said load is secured by said hook and a second position at which said load is released by said hook; and,

(c) latching means for releasably engaging said beam in said secured position, said latching means comprising

(i) a contact roller carried by said beam and rotatable about a roller axis extending parallel to said beam axis; and,

(ii) an interference shaft rotatably mounted between said sides for rotation about a shaft axis extending parallel to said beam axis and said roller axis, said shaft being rotatable between a first position at which said shaft abuts said contact roller along a line of abutment thereby securing said beam against pivotal movement, and a second position at which said beam is free to pivot downwardly past said shaft to permit release of said load.

4,998,764

COMBINATION HANDLE AND JAR BRACKET FOR PUMPS

Mark E. O'Connell, Cedar Grove, and Roy J. Rozek, Plymouth, both of Wis., assignors to Thomas Industries Inc., Louisville, Ky.

Continuation of Ser. No. 260,064, Oct. 20, 1988, abandoned. This application Aug. 20, 1990, Ser. No. 569,590

Int. Cl.[5] B65D *85/00*

U.S. Cl. 294—146 **12 Claims**

1. A combination handle/bracket for use with a portable device and an associated component comprising:

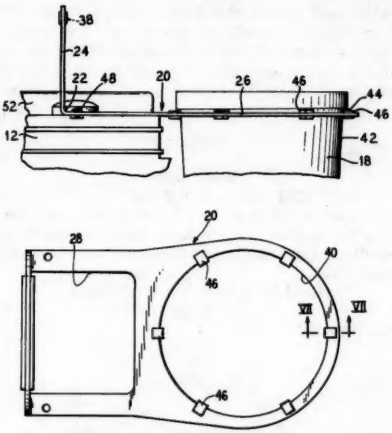
a single piece handle/bracket formed from a plate-like member having a first end and a second end;

said first end having a first central cut-out therein forming a pair of opposed legs and a connecting portion at a terminal end of said first providing a manually graspable handle;

said second end having a second central cut-out therein forming a receptacle for said component;

a bend formed between said first end and said second end

such that said first end is oriented at an angle relative to said second end; and



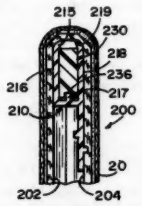
fastening means, disposed between said handle and said second central cut-out, for securing said member to said device.

4,998,765

SLIDING VISOR

Kim L. Van Order, Hamilton; Kevin L. Wright, and Nels R. Smith, both of Holland, all of Mich., assignors to Prince Corporation, Holland, Mich.

Filed Feb. 21, 1989, Ser. No. 313,536
Int. Cl.[5] B60J *3/02*
U.S. Cl. 296—97.11 3 Claims



1. A sliding visor for a vehicle comprising:

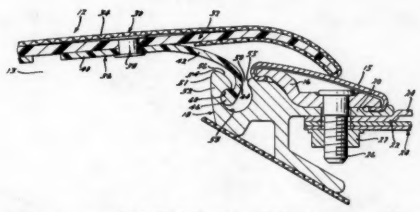
a support member for attachment above a window of a vehicle and having a generally rectangular cross-section, said visor including a visor core and guide means cooperatively and slidably coupling said visor core to said support member such that said visor can slide along said support member, wherein said guide means comprises a generally U-shaped member having legs which partially circumscribe said support member for slidable movement therealong, and wherein said support member includes an elongated recess extending along one edge thereof an wherein said guide means includes rib means extending into said recess for providing additional stability to the connection of said guide means to said support member.

4,998,766

CONVERTIBLE TOP BOOT ATTACHING ARRANGEMENT

Richard F. Biermacher, West Bloomfield; Thomas G. Tallon, Metamora; Dwayne A. Black, Dearborn Heights, and Billy J. Barton, Royal Oak, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Dec. 22, 1989, Ser. No. 455,680
Int. Cl.[5] B60J *7/20*
U.S. Cl. 296—136 1 Claim



1. In a motor vehicle body having a foldable convertible top, a storage well in the vehicle body for receiving the foldable top, and a convertible top boot for overlying the storage well when the top is stored therein, a boot attaching arrangement comprising:

a well opening extending generally transversely of the vehicle body, said well opening being defined along an aft periphery thereof by a coextensive retainer member secured to the vehicle body, said retainer member having engagement means associated therein; and

said convertible top boot adapted to cover said well opening, said boot have at least one peripheral edge stiffener panel adapted to overlie said retainer member, fastener means secured to an underside of said stiffener panel, said fastener means adapted for locking attachment to said engagement means, the improvement in said boot attaching arrangement comprising:

said fastener means defined by a plurality of plastic J-section fastener strips, each said fastener strip comprising a forwardly extending planar pad portion and a rearwardly extending hook-shaped portion interconnected by an intermediate downwardly curved arcuate flexible web portion;

each said pad portion mounted in a flush manner on said underside, each said hood-shaped portion extending rearwardly from the arcuate web portion thereof and terminating in a downwardly curved flange, each said curved flange having a free edge thereof formed with an enlarged locking bead portion coextensive therewith;

said engagement means comprising a transversely extending upwardly opening lead-in gap, said lead-in gap defined by a forward upstanding detent rib portion having a vertically disposed forwardly facing arcuate cam surface, said arcuate cam surface terminating in a curved upper edge followed by a rearwardly and downwardly sloped arcuate guide shoulder, said arcuate guide shoulder defining, with a rearwardly spaced opposed curved stop shoulder, said lead-in gap having a predetermined longitudinal dimension through which said bead portion is passed, said lead-in gap providing an entrance of an upwardly opening circular sectioned releasably latching furrow forming in said detent rib portion an undercut fittable groove of arcuate shaped section; and

whereby upon an installer applying a combined downward and rearward force on said stiffener panel causing each said intermediate arcuate web portion to resiliently flex such that each said bead portion is initially passed through said lead-in gap for reception in said latching furrow and upon each said hook-shaped portion resiliently riding over said upstanding detent rib portion and contacting said stop shoulder, said latching furrow accommodating each said

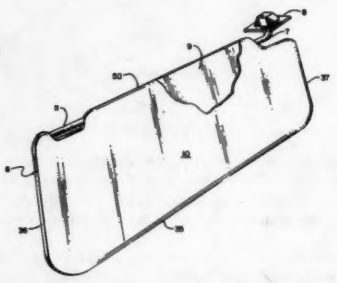
bead portion for subsequent interlocking capture in said fittable groove, the installer ceases the application of the combined force without requiring the installer to view said boot attaching arrangement.

4,998,767

VEHICLE SUN VISOR AND METHOD OF MAKING

Abdi R. Lawassani, Pontiac, and Mark J. Wasik, Alma, both of Mich., assignors to United Technologies Automotive, Dearborn, Mich.

Filed Aug. 25, 1989, Ser. No. 398,814
Int. Cl.[5] B60J *3/00*
U.S. Cl. 296—97.1 **18 Claims**



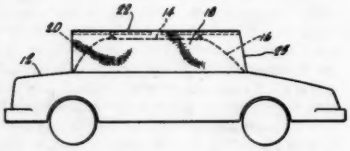
1. A sun visor for use in motor vehicles comprising:
a visor core; and
a covering material;
characterized by:
said core including an elongate integral flange formed along an edge portion of the visor core, said flange being engageable with a confronting rigid portion of the visor core;
said covering material preformed into an envelope in the shape of the exterior of said core, the envelope further having an open edge coincident to said flange;
said core being received within the open envelope; and
material along the open edge of said envelope being retained between said core and said flange.

4,998,768

VEHICLE SUNSHADE

Kenneth K. L. Wu, 19417 Trentham Ave., Cerritos, Calif. 90701

Filed Nov. 7, 1988, Ser. No. 268,369
Int. Cl.[5] B60D *25/06*
U.S. Cl. 296—136 **7 Claims**



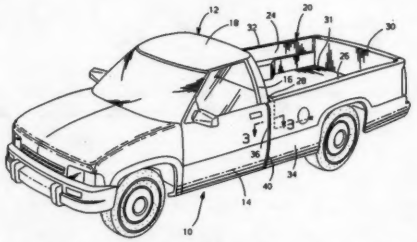
7. A removable sunshade for a vehicle having a roof and windows, including at least a front window and one side window, the sunshade comprising:
(a) a rigid supporting frame;
(b) means for removably attaching the frame to the roof of a vehicle, the attaching means being secured to the vehicle roof; and
(c) a flexible cover for the vehicle, the cover being adapted to be supported by the frame spaced apart from the vehicle roof and draping over the front and side windows of the vehicle to reduce heating of the vehicle's interior by the sun or discoloration of the interior of the vehicle by ultraviolet rays of the sun;
in which the frame comprises a plurality of rigid arms; and
in which each arm has at least four sections which are foldable bracings pivotally attached to the depending leg so that two sections (i) can be aligned parallel to the vehicle roof when mounted on the roof, and (ii) can be slid into a position alongside the depending leg so that the frame can be compactly stored away.

4,998,769

CARGO BOX FOR TRUCK

Roger E. Johnson, Utica; Thomas C. Jensen, Clarkston; Edward C. VanRossen, Roseville, and Kevin M. O'Donnell, Birmingham, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed May 4, 1990, Ser. No. 519,087
Int. Cl.[5] B60R *27/00*
U.S. Cl. 296—183 **3 Claims**



1. A cargo box for a vehicle having a front portion and a rear portion and a frame member supporting on operator's cab provided with a pair of laterally spaced side doors each of which has a rear vertical section which is releasably latch to a pillar portion of the cab, said cargo box comprising a pair of laterally spaced side walls, a front wall and a back wall, a floor joined to and rigidly interconnecting said front, side and back walls, said cargo box being positioned on said frame member so that a space exists between said front wall and the rear of said cab, and a wing section extending forwardly from each said side wall beyond a rear corner of said cab and into close proximity and coplanar with said rear vertical section of a said door so as to form a substantially uninterrupted surface between said front portion and said rear portion and to prevent said space between said front wall and the rear of said cab being visible when said vehicle is viewed from the side thereof.

4,998,770

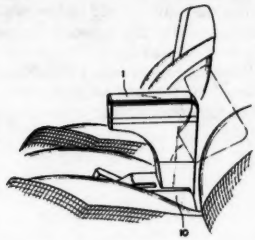
ARMREST FOR MOUNTING ON A CONSOLE BOX

Takeshi Shimizu, Anaheim; Kenji Saito, Brea; Tomohisa Fushimi, Placentia; Gisela Huemann, Manhattan Beach, and Jose M. Gonzales, Cerritos, all of Calif., assignors to Suzuki Motor Corporation, Shizuoka, Japan

Filed Aug. 29, 1989, Ser. No. 399,821
Int. Cl.[5] B60R *7/04*
U.S. Cl. 296—37.8 **3 Claims**

1. An armrest mountable on a console box having a lid, of an automobile, comprising:
a lower box having an insertion portion insertable into said console box;
a center box mounted on an upper side of said lower box and being angularly movable rearwardly;
an armrest lid mounted on an upper side of said center box and being angularly movable rearwardly; and
means for mounting said console box lid to said console box

so that said console box lid can be removed from said console box, said insertion portion of said lower box being



fixedly secured to said console box by said mounting means.

4,998,771

VEHICLE ROOF WITH TWO-PART COVER

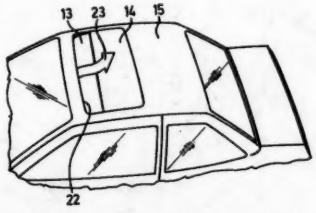
Thomas Schreiter, Hochmeierstr. 6, 8000 Muenchen 70; Peter Reihl, Gerlichstr. 3, 8000 Muenchen 60; Stefan Miklosi, Fockensteinstr. 27, 8000 Muenchen 90; Burkhard Reinsch, Karwendelstr. 4, 8027 Neuried; Bernhard Wingen, Hohenrainerstr. 3, 8152 Feldkirchen; Werner Pätz, Hittostr. 10, 8050 Freising, and Arpad Furst, Geschwister Scholl Ring 35, 8034 Germering, all of Fed. Rep. of Germany

Filed Jul. 20, 1990, Ser. No. 554,915

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1989, 3924035

Int. Cl.[5] B60J *7/043*

U.S. Cl. 296—217 **20 Claims**



1. A vehicle roof having a stationary roof skin with a roof opening therein, and a movable cover for closing said roof opening in a closed position, said cover having a front and a rear cover part; wherein a longitudinal guide mechanism is provided on each side of said roof opening, the rear cover part being slidably guidable by said roof guide mechanism into an open position in which said roof opening is at least partially uncovered; and comprising a means for pivoting said front cover part into a ventilation position in which it is pivoted relative to said rear cover part and said rear cover part is kept in said closed position by lowering a front edge of said front cover part a distance below said stationary roof skin in a manner creating a ventilation gap between said front edge of said front cover part and a front edge of said roof opening while maintaining a rear edge of said front cover part at least approximately even with a front edge of said rear cover part.

4,998,772

ATTACHMENT CLIP FOR SEAT BACK SIDE SHIELD

William M. Safran, Farmington Hills, and James D. Edwards, Ypsilanti, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

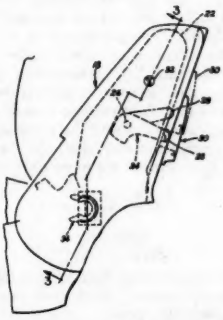
Filed May 3, 1990, Ser. No. 518,622

Int. Cl.[5] B60N *2/02*

U.S. Cl. 297—355 **1 Claim**

1. In a vehicle seat structure comprising a seat back recliner apparatus having a pivot pin extending outboard therefrom, a plastic side shield panel for covering the seat back recliner apparatus, said panel having the inner surface thereof integrally molded with a raised cylindrical C-shaped attachment collar portion having an open end adapted to engage a circumferential slot formed in said pivot pin so as to retain said panel on said seat structure, said C-shaped attachment collar portion having an arcuate outer surface and an open end defined by a pair of diametrically opposed mirror image jaws, each said jaw spaced outwardly from said panel inner surface so as to define an under-cut recess therewith, wherein an add-on clip providing an improved arrangement for engaging said pivot pin circumferential slot comprising:

a spring steel clip having a U-shaped bend defining a rectangular-shaped inner body portion and an outer return bent bifurcated portion interconnected by a planar transverse bight portion, said return bent bifurcated portion defining a longitudinal slot having a closed semi-circular end and an open end, said longitudinal slot providing a pair of mirror image yieldable legs laying in the same plane, said closed end in the form of central semi-circular opening, said legs adapted to straddle said pivot pin circumferential slot in a releasably locked manner, said yieldable legs having the inner opposed edges thereof diverging toward their free ends from opposed shoulders, each said should defined by the juncture of said semi-circular opening with its associated diverging inner edge;



said clip inner body portion having a central substantially D-shaped cutout therein defined by a pair of spaced longitudinal internal edges, a transverse chordal edge adjacent said bight portion extending laterally between a pair of curvet fillets, and said clip inner body portion having a transverse central tongue in opposed relation to said chordal edge, said central tongue bent inwardly from said body portion at an obtuse angle, said central tongue having a free transverse edge with said transverse edge spaced a predetermined distance from said semi-circular opening, said central tongue extending laterally between a pair of rounded notches with each said notch establishing a juncture with its associated cutout longitudinal edge;

said chordal edge having an inwardly struck longitudinal extending prong at each of its junctions with an associated one of said curved fillets;

said spring clip D-shaped cutout sized to be received on said raised C-shaped collar in a snap-fitting manner such that each said notch extending into an associated one of said pair of jaw undercut recesses with said central tongue bridging said collar open end, and said clip prongs biting into and securely gripping said C-shaped collar outer surface whereby said pair of yieldable legs extend in a predetermine direction receiving said pivot pin circumferential slot in said longitudinal slot, whereby said yieldable legs releasably engage said pivot pin circumferential slot so as to secure said panel to said seat back recliner apparatus.

4,998,773

ARTICLE OF FURNITURE MADE FROM THERMOSETTING RESIN IMPREGNATED FELT

Gaetano Pesce, Paris, France, assignor to Cassina S.p.A., Meda, Italy

Division of Ser. No. 239,215, Aug. 31, 1988, Pat. No. 4,907,328.
This application Jun. 27, 1989, Ser. No. 371,928
Claims priority, application Italy, Sep. 8, 1987, 21841 A/87
Int. Cl.[5] A47C 5/00
U.S. Cl. 297—446 4 Claims

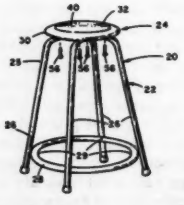
1. An article of furniture in the form of a chair formed by shaping at least one flat sheet of a pliable felt of a thickness between 10 mm and 60 mm into a three-dimensional shape having unitarily formed from said one sheet, a support portion, a seat portion, a back portion and side portions and having said support portion rigidified by thermosetting of a hardenable resin impregnating same to support said article while at least said seat portion of said sheet remains pliable and of substantially an original flexibility of said sheet, the thermosetting of said hardenable resin being such that said sheet at said back portion and said side portions are more flexible than said support portion.

4,998,774

STOOL SEAT

George L. Huff, Greeneville; Robert Archer, Johnson City, and James P. Haynes, Chuckey, all of Tenn., assignors to Meco Corporation, Greenville, Tenn.

Filed Sep. 15, 1989, Ser. No. 407,636
Int. Cl.[5] A47C 9/00
U.S. Cl. 297—461 9 Claims



1. A stool seat comprising:

means providing an impervious top wall defining an upper surface upon which a user sits and having a peripheral edge, said upper surface being shaped so as to provide a concave seating area for the user;

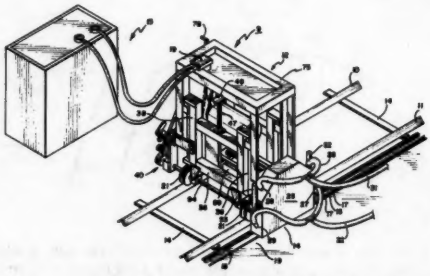
means providing an impervious bottom wall sealingly joined to the top wall along said peripheral edge, said top wall adapted to support itself in a suspended condition above said bottom wall from said peripheral edge to provide a single sealed cavity containing a fluid at a predetermined pressure between said top and bottom walls and said top wall being further adapted to resiliently deflect toward said bottom wall under the weight of a user so that the pressure of the fluid contained in the sealed cavity is increased when the user sits upon said upper surface, said upper surface adapted to deflect downwardly under the weight of a user and said bottom wall includes a series of ribs encircling the center of said bottom wall for rigidifying said bottom wall and arranged to extend along paths forming a pair of concentrically-arranged rows of ribs, the ribs of at least one of said rows projecting generally upwardly toward the top wall so as to restrict downward deflection of the upper surface beyond a predetermined limit.

4,998,775

APPARATUS FOR PRECISION CUTTING OF CONCRETE SURFACES

David L. Hollifield, 2360 Wash Lever Rd., Chapin, S.C. 29036

Filed Oct. 10, 1989, Ser. No. 419,426
Int. Cl.[5] B28D 1/04
U.S. Cl. 299—39 23 Claims



21. A concrete cutting machine for repairing joints between slabs of a concrete floor, said machine comprising:

a vehicle having means for engaging a track means to guide said vehicle along a path extending parallel to one of said joints;

a motor-driven cutting blade;

carriage means supported by said vehicle for moving said motor-driven cutting blade in a vertical direction;

table means supported by said vehicle for moving said motor-driven cutting blade in a horizontal direction perpendicular to said joint, said movements permitting said cutting blade to be positioned into and out of different cutting positions each parallel to said joint;

shroud means comprising an enclosure for enclosing a part of said blade when said part is above the surface of said concrete floor while said floor is being cut by said blade; and,

coolant means for supplying coolant to and removing coolant from said shroud means to cool said cutting blade during a cutting operation, said coolant means including inlet means connected to said enclosure at an upper position thereof near a top portion of said blade, and outlet means connected to said enclosure at a position thereof near said concrete surface.

4,998,776

SHIELD TUNNELING WITH OPTIONAL SECTION AND MACHINE

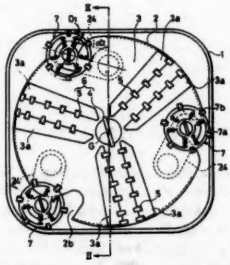
Shohei Chida, Tokyo; Masami Kozaki; Toshinori Asahi, both of Osaka; Chiyoaki Ono; Seiji Iwasa, both of Tokyo; Taizou Fukunaga, Kobe, and Moriyuki Takemura, Ashiya, all of Japan, assignors to Zaidan Hohjin Doboku Kenkyu Center; Nittoku Kensetsu Kabushiki Kaisha; Nippon Hyumukan Kabushiki Kaisha, all of Tokyo and Kabushiki Kaisha Kobe Seiko Sho, Kobe, all of, Japan

Filed Sep. 29, 1989, Ser. No. 413,756

Claims priority, application Japan, Feb. 15, 1989, 1-35613; Apr. 18, 1989, 1-99869; May 25, 1989, 1-133759; May 25, 1989, 1-133760; May 25, 1989, 1-133761; May 25, 1989, 1-133762

Int. Cl.[5] E21D *9/10*

U.S. Cl. 299—59 17 Claims



13. A machine for shield tunneling with an optional cross section characterized in that the machine comprises:

a machine body,

a center cutter supported by the machine body so as to be rotatable about an axis extending in the direction of propulsion of the body,

a rotary body supported so as to be rotatable about the same axis as the center cutter,

a planetary cutter supported by the rotary body so as to be movable radially of the rotary body, and

operating means for moving the planetary cutter radially of the rotary body to permit the planetary cutter to revolve along a locus during the rotation of the rotary body so that the planetary cutter excavates the region between the profile of excavation by the center cutter and the desired profile of excavation,

wherein said planetary cutter has a rotary shaft, further comprising:

means for driving the rotary body,

planetary cutter drive means, and

a drive transmission for transmitting the torque of the planetary cutter drive means to the rotary shaft of the planetary cutter.

4,998,777

COAL-CUTTING MACHINE HAVING HORIZONTALLY SWIVELLABLE JIB BOOM AND VERTICALLY SWIVELLABLE LOADING MEANS

Otto Schetina; Arnulf Kissich; Werner Stecher, all of Zeltweg; Helmut Habenicht, Weiskirchen; Wilhelm Papst, Lind bie Zeltweg, and Bernhard Pieterski, Graz, all of Austria, assignors to Voest-Alpine Maschinenbau Gesellschaft m.b.H., Linz, Austria

Filed Nov. 15, 1989, Ser. No. 436,883

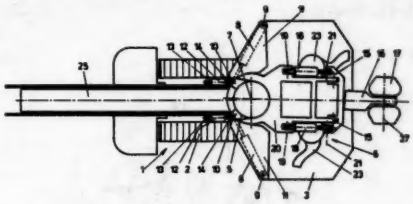
Claims priority, application Austria, Nov. 22, 1988, 2871/88

Int. Cl.[5] F21C *25/68, 31/10*

U.S. Cl. 299—67 9 Claims

5. A coal-cutting machine including a swivelling jib boom on which cutting implements are rotatably supported and a loading means comprising a loading platform, said loading means being swivellable about only a first swivel axis extending transversely to a longitudinal direction of the machine,

wherein the loading platform is angularly, rigidly connected to a swing gear that allows swivelling of the jib boom in a horizontal direction, and said loading platform is supported, together with said swing gear, on a frame of said



coal-cutting machine so as to swivel about the axis extending transversely to the longitudinal direction of the machine, and

wherein the jib boom is supported via said swing gear only by a loading ramp, being connected with said loading platform, and does not contact said frame.

4,998,778

MINING TOOL INCLUDING A CHISEL AND A CHISEL HOLDER

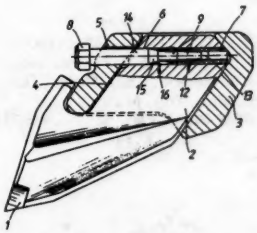
Gert Braun, and Ernst Braun, both of Essen-Heisington, Fed. Rep. of Germany, assignors to Halbach & Braun Industrieanlagen, Wuppertal, Fed. Rep. of Germany

Filed Nov. 30, 1989, Ser. No. 444,018

Claims priority, application Fed. Rep. of Germany, Jan. 4, 1989, 3900140

Int. Cl.[5] E21C *25/48, 27/44*

U.S. Cl. 299—91 6 Claims



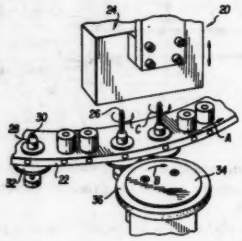
1. In a mining tool for the breaking-down of minerals, particularly coal, the mining tool including a chisel with a chisel shaft and a chisel holder with a shaft receiving means adjusted in shape to the chisel shaft, the chisel holder having an insertion bore and the chisel shaft having a receiving bore, a chuck for a locking bolt mounted in the receiving bore, the insertion bore and the receiving bore extending essentially transversely of the chisel holder an the chisel shaft and being in alignment when the locking bolt is driven into the bore, the improvement comprising the locking bolt comprising a mandrel screw having a shaft and a bottom end, the shaft having a threaded portion with a thread which over its length includes a sharp thread and a trapezoidal thread, the trapezoidal thread ending at the bottom end of the threaded portion, the trapezoidal thread having circumferential surfaces arranged successively in axial direction of the screw, the circumferential surfaces defining a driving-in cone.

4,998,779

APPARATUS AND METHODOLOGY FOR PRODUCING ROUNDED BRUSH TIPS

Frank M. Kigyos, Sugar Grove, Ill., assignor to North American Philips Corporation, New York, N.Y.

Filed Dec. 26, 1989, Ser. No. 457,021
Int. Cl.[5] A46D 1/08
U.S. Cl. 300—10 14 Claims



1. Apparatus for producing rounded tips on heat meltable bristles of brushes having longitudinal axes, said apparatus comprising:

(a) a heating chamber having at least one hollow cavity having at least one opening and a continuous inner wall surrounding said at least one opening;

(b) first means for mounting a plurality of brushes;

(c) second means for rotating each brush about its longitudinal axis;

(d) third means for intermittently translating said plurality of brushes; and

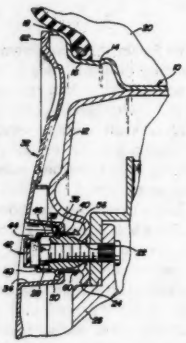
(e) fourth means for moving said heating chamber back and forth between a first position in which said at least one hollow cavity receives a corresponding one of said plurality of brushes while it is stopped with said continuous inner wall of said at least one hollow cavity being at least generally parallel to the longitudinal axis of the brush and a second position in which said at least one hollow cavity is spaced from said plurality of brushes.

4,998,780

WHEEL TRIM RETENTION

Mark S. Eshler, Howell; Jon D. Parisen, Troy, both of Mich., and Martin E. Russell, White House, Tenn., assignors to Saturn Corporation, Troy, Mich.

Filed Oct. 2, 1989, Ser. No. 415,751
Int. Cl.[5] B60B 7/12
U.S. Cl. 301—37 S 5 Claims



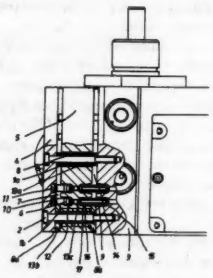
1. In a vehicle having a wheel mounted thereon by a number of lug nuts threaded on lugs of the vehicle, each lug nut having a threaded exterior portion, a wheel cover retention system comprising, in combination, a cover member for the vehicle wheel including a number of apertures through an axially displaceable center portion thereof, each aperture receiving a respective lug nut and being surrounded by a cover flange, a cap member threaded on the threaded exterior portion of each lug nut and including a flange engaging the cover flange to engage an outer portion of the cover member with the rim portion of the vehicle wheel and displace the center portion of the cover axially inwardly to provide an axially outward biasing force, and cooperating means on the cap member flanges and cover member flanges resisting rotation of the cap member flanges relative to the cover member flanges and unthreading of the cap members from the exterior threaded portions of the lug nuts, the rotational resistance of the cooperating means being enhanced by the axially outward biasing force.

4,998,781

BRAKE DEVICE FOR A HYDRAULIC VEHICLE BRAKE SYSTEM

Georg Kehl; Heinz Siegel, both of Stuttgart; Helmut Deringer, Boeblingen; Dietmar Rischen, Korntal-Muenchingen; Andreas Abbing, Ludwigsburg, and Alfred Bullinger, Korntal-Muenchingen, all of Fed. Rep. of Germany, assignors to Robert GmbH Bosch, Stuttgart, Fed. Rep. of Germany

Filed Sep. 8, 1989, Ser. No. 404,474
Claims priority, application Fed. Rep. of Germany, Nov. 4, 1988, 3837419
Int. Cl.[5] B60T 13/16, 17/02
U.S. Cl. 303—10 18 Claims



1. A brake device for a hydraulic vehicle brake system, which comprises a feed pump housing, an assembly housing attached elastically to said feed pump housing, said feed pump housing and said assembly housing form two components which communicate with one another by means of at least one suction and pressure line, which are embodied as housing bores in both components and in which at least one pivotable and longitudinally displaceable small connecting tube rests in two bearing bores, aligned with one another in both components, said feed pump housing (5) has through bores (13*a*, 13*b*), through which bearing tubes (1*a*, 1*b*) surrounded by damping, elastic material extend, which bearing tubes are secured by means of screws or stay bolts (2) between the assembly housing (3) and a fastening plate (4), on which rest bolts (6) that protrude into the feed pump housing (5), said bearing tube (1*a*) is disposed in a middle portion of the feed pump housing (5) and is surrounded by a damping sleeve (8) having a jacket face that is dished or thickened toward the middle.

4,998,782

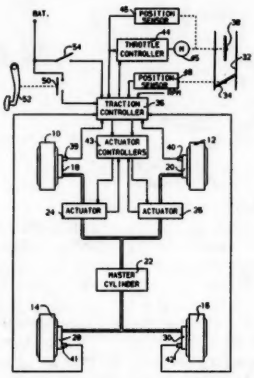
ENTITLED VEHICLE TRACTION CONTROL SYSTEM

David A. Thatcher, Sterling Heights, and Gordon L. Tierney, Washington, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 350,271, May 11, 1989, abandoned. This application Aug. 20, 1990, Ser. No. 569,490

Int. Cl.[5] B60T 8/08

U.S. Cl. 303—110 2 Claims



1. A traction control system for a vehicle having an engine for applying a driving torque to a vehicle driven wheel, the system comprising, in combination:

a wheel speed sensor for measuring driven wheel speed V_f;

a vehicle speed sensor for measuring vehicle speed V_r;

means responsive to the measured driven wheel speed for determining driven wheel acceleration a_f;

means responsive to the measured vehicle speed for determining vehicle acceleration a_r;

means for determining a spin ratio value of the driven wheel in accord with the expression $(V_f-V_r)/V_f$;

means for determining an excessive spinning condition of the driven wheel in response to an excessive driving torque applied thereto from the engine; and

means responsive to a determined excessive spinning condition for applying a braking force to the driven wheel having a value (A) that is a predetermined function of the value of the expression a_f-a_r and the determined spin ratio value when the vehicle speed is less than a predetermined value and (B) that is a predetermined function of the value of the expression a_f-a_r and the value of the expression V_f-V_r when the vehicle speed is greater than the predetermined value.

4,998,783

TRACK ROLLER OR GUIDE ROLLER FOR TRACK-LAYING VEHICLES

Gunter Erlenmaier, Vellmar, and Klaus Spies, Remscheid, both of Fed. Rep. of Germany, assignors to Diehl GmbH, Nuremberg, Fed. Rep. of Germany

Filed May 22, 1989, Ser. No. 355,567

Claims priority, application Fed. Rep. of Germany, Jun. 3, 1988, 3818841

Int. Cl.[5] B62D 55/14

U.S. Cl. 305—56 10 Claims

1. A track or guide roller for track-laying vehicles, comprising:

first and second disc members connected together, connectable with a hub, and forming a guide gap between the first and second disc members for receiving guide teeth, each of the first and second disc members including

(i) a central portion,

(ii) a first conical portion connected to the central portion and radially and laterally extending outward therefrom, and

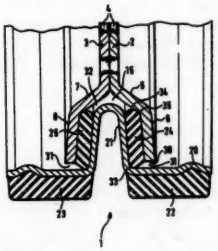
(iii) a second conical portion connected to the first conical portion and radially and laterally extending outward therefrom;

a rim member extending radially outside the first and second disc members, and including

(i) first and second cylindrical portions located, respectively, on first and second lateral sides of the guide gap, and

(ii) a hollow rib portion connected to and radially extending inward from the first and second cylindrical portions, and extending into the guide gap, laterally between and spaced from the first and second disc members,

wherein the hollow rib portion is laterally spaced from the second conical portion of the first disc member, and the hollow rib portion and the second conical portion of the first disc member define therebetween a first annular interspace; and the hollow rib portion is laterally spaced from the second conical portion of the second disc member, and the hollow rib portion and the second conical portion of the second disc member define therebetween a second annular interspace;



tread means mounted on the first and second cylindrical portions of the rim member;

a first annular resilient member engaging and laterally captured between the first disc member and the hollow rib portion of the rim member, and substantially completely filling the first annular interspace; and

a second annular resilient member engaging and laterally captured between the second disc member and the hollow rib portion of the rim member, and substantially completely filling the second annular interspace;

wherein the first and second conical portions of the first disc member form a first curved intersection, and the first annular resilient member engages said first curved intersection in a complementary fit therewith, and the first and second conical portions of the second disc member form a second curved intersection, and the second annular resilient member engages said second curved intersection in a complementary fit therewith.

4,998,784

AUTOMOTIVE WINDSHIELD FOR A HEAD UP DISPLAY SYSTEM

Glenn E. Freeman, Tarentum; James L. Valimont, Cheswick, both of Pa.; James H. Dunaway, Stow, Ohio, and Karen J. Korenkiewicz, Gibsonia, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Aug. 31, 1988, Ser. No. 238,799

Int. Cl.[5] G02B 5/32

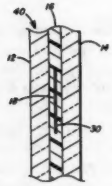
U.S. Cl. 350—3.7 25 Claims

1. A method of assembling a laminated holographic transparency comprising:

positioning an interlayer sheet on a surface of a rigid ply;

positioning a hologram supported on a carrier on a major surface of said sheet;

laminating said ply, sheet, hologram and carrier together to form a unitary structure;



removing said carrier said structure such that said hologram remains laminated to said structure;

laminating at least one additional rigid ply to said interlayer sheet, wherein said interlayer and said hologram are positioned between said plies.

4,998,785

DECORATIVE SURFACE AND A METHOD OF PRODUCING IT

Graham T. Ridout, Lane End, Monkshanger, Farnham, Surrey, United Kingdom

Filed Jul. 6, 1987, Ser. No. 70,026

Claims priority, application United Kingdom, Jul. 4, 1986, 8616381

Int. Cl.[5] G02B *5/32;* G03H *1/02*

U.S. Cl. 350—3.7 **6 Claims**

1. A method of generating a surface with a light diffracting pattern by a method including the following steps:

generating two coherent monochromatic beams of light, comprising a reference beam and a second beam which consists of a bundle of divergent sub-beams;

illuminating a photosensitive surface with both the reference beam and the second beam at an angle to each other; and

developing and fixing the photosensitive surface;

wherein the second beam is itself generated by passing a single light beam through a mask to form a narrow strip of light, then passing that light through a narrow D-shaped plano-cylindrical lens which tends to focus the strip onto the sensitive surface as a narrow line transverse to the strip of light, and finally passing the narrow strip of light through a plurality of first small plano-cylindrical lenses extending transverse to the strip of light, each such lens serving to divide the light into the plurality of individual sub-beams in the bundle.

4,998,786

METHOD OF PRODUCING HOLOGRAMS PARTICULARLY FOR HOLOGRAPHIC HELMET DISPLAYS

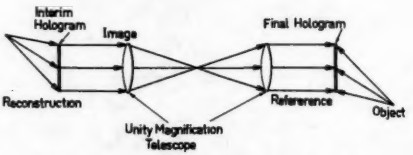
Asher A. Friesem, and Yaakov Amitai, both of Rehovot, Israel, assignors to Yeda Research and Development Co. Ltd. and The Weizman Institute of Science, both of Rehovot, Israel

Filed Nov. 14, 1988, Ser. No. 270,868

Claims priority, application Israel, Jan. 15, 1988, 85108

Int. Cl.[5] G02B *5/32;* G03H *1/28, 1/22*

U.S. Cl. 350—3.7 **3 Claims**



1. A method of producing a final hologram for a holographic optical element for use in imaging a multi-dimensional array of points, in which two coherent recording beams are utilized to produce an interference pattern which is recorded to form the final hologram over an entire field of view using reconstruction, object and reference waves according to predetermined recording and readout geometries and parameters, characterized in that at least two intermediate holograms are first produced and used for producing the final hologram; at least one intermediate hologram being produced by selecting the recording and readout parameters to reduce not only astigmatism, but also coma, spherical and field curvature aberrations which arise in holographic elements used for imaging a two-dimensional array of points because of the differences between the recording and readout geometries; and at least one other intermediate hologram being produced satisfying the Bragg condition over the entire final hologram in order to achieve high diffraction efficiency over the entire field of view of the final hologram.

4,998,787

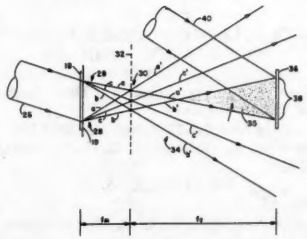
METHOD OF FABRICATING A MULTIPLE HOLOGRAPHIC LENS

Stephen J. Caputi, Centerport, N.Y.; Douglas S. Hobbs, Chelmsford, Mass.; Benjamin J. Pernick, Forest Hills; Nils J. Fonneland, Lake Ronkonkoma, both of N.Y., and John V. Fine, Sr., Goose Creek, S.C., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Oct. 5, 1988, Ser. No. 253,733

Int. Cl.[5] G02B *5/32;* G03H *1/28*

U.S. Cl. 350—3.73 **12 Claims**



1. A method of fabricating a simultaneously exposed multiple holographic lens comprising the steps of:

(a) fabricating on a photographic plate a sequentially exposed master multiple holographic lens formed from interference patterns of superimposed coherent light, said master lens comprising an array of sequentially exposed

holographic lens elements, each of said lens elements substantially covering the entire area of the photographic plate and being fabricated by the method comprising the steps of,

selecting a focusing lens having a desired focal length and f-number,

directing a fabricating light beam from a coherent source through said focusing lens,

positioning a master holographic recording medium downstream of said focusing lens such that a first area therein will be illuminated by said fabricating light beam,

directing a reference beam of light from the coherent source toward the area of the master holographic recording medium illuminated by said fabricating beam,

exposing the master holographic recording medium to the fabricating and reference beams simultaneously to holographically record on an interference pattern having a first focal point,

positioning the master recording medium such that a second area thereon, overlapping said first area, will be illuminated by the fabricating and reference light beams simultaneously,

exposing the master holographic recording medium to the fabricating and reference beams simultaneously to holographically record an interference pattern having a second focal point spaced from said first focal point,

repeating the positioning and exposing steps until a desired number of interference patterns are recorded having a desired number of spaced focal points, and

developing the master holographic recording medium to form said sequentially exposed master multiple holographic lens having an array of lens elements corresponding to the desired number of interference patterns;

(b) illuminating the master multiple holographic lens with a first beam of light from a coherent source to provide a plurality of refracted light waves equal in number to the number of lens elements;

(c) positioning a holographic recording medium such that an area thereon is illuminated simultaneously by each of the plurality of refracted lights waves;

(d) directing a second beam of light from the coherent source toward the area of the holographic recording medium illuminated by the plurality of refracted light waves;

(e) exposing the holographic recording medium simultaneously to the second beam of light and the plurality of refracted light waves; and

(f) developing the holographic recording medium to form a simultaneously exposed multiple holographic lens therefrom.

4,998,788

REFLECTION ELECTRON HOLOGRAPHY APPARATUS

Nobuyuki Osakabe, Kodaira, and Akira Tonomura, Koganei, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 10, 1990, Ser. No. 462,769

Claims priority, application Japan, Jan. 13, 1989, 1-4999

Int. Cl.[5] G03H *5/00*

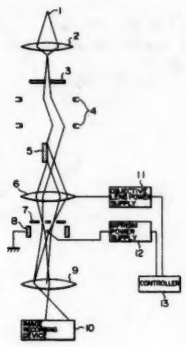
U.S. Cl. 350—3.8 **8 Claims**

1. A reflection electron holography apparatus comprising:

an electron source for emitting an electron wave;

means for guiding the electron wave emitted from the electron source so that one part of the electron wave illuminates a surface of a specimen and is reflected along a first predetermined path and another part of the electron wave is directly passed along a second predetermined path without illuminating the surface of the specimen; and

means for controlling both the first and second predetermined paths of the one and another parts of the electron wave so as to effect an electron wave interference image



of the one and another parts of the electron wave on a screen.

4,998,789

KALEIDOSCOPES FOR VIEWING OBJECTS AND METHOD OF REPRODUCING VIEWED KALEIDOSCOPIC IMAGES

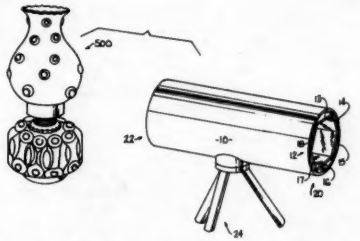
Janice Atkins, 3835 Main #611, Kansas City, Mo. 64111

Division of Ser. No. 294,481, Jan. 6, 1989, abandoned.

Filed Jan. 8, 1990, Ser. No. 461,931

Int. Cl.[5] G02B *23/00*

U.S. Cl. 350—4.1 **6 Claims**



1. In a kaleidoscope having an elongated housing with a proximal end and a distal end, the improvement comprising:

a plurality of reflective members forming a mirror array of a desired cross section, said array longitudinally extending through said housing and dividing the interior of said housing into predetermined cross-sectional areas corresponding to the cross-sectional configuration of said mirror array, said mirror array at said distal end reflecting the image of an object sighted through said proximal end throughout the extent of said mirror array, wherein said mirror array comprises:

a hexagonal mirror array extending through the housing from said proximal end towards said distal end; and

a triangular mirror array extending through said housing from said distal end towards said proximal end whereby said reflected image varies according to the end of said housing through which said object is viewed.

4,998,790

OPTICAL SCANNING APPARATUS

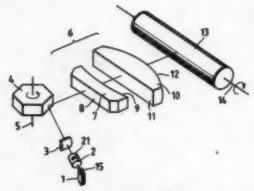
Takashi Iizuka; Mitsunori Iima, and Akira Morimoto, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo K.K., Tokyo, Japan

Filed Feb. 27, 1990, Ser. No. 485,904

Claims priority, application Japan, Feb. 28, 1989, 1-48368; Mar. 13, 1989, 1-60515

Int. Cl.[5] G02B *26/10*

U.S. Cl. 350—6.1 11 Claims



1. An optical scanning apparatus comprising:

a light source emitting recording laser light;

a collimator lens for collimating the laser light emitted from the light source;

a deflector with which the laser light emerging from the collimator lens is deflected in a main scanning direction; and

a scanning lens with which the laser light deflected by the deflector is converged to scan an exposure plane moving in a sub-scanning direction, at least part of said collimator lens being shaped to have different diameters in the main and sub-scanning directions.

4,998,791

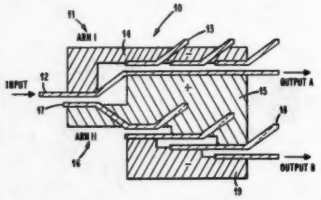
INTEGRATED OPTICAL SWITCHES WITH VERY HIGH EXTINCTION RATIOS

Kwang T. Koai, Acton, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Oct. 16, 1989, Ser. No. 422,271

Int. Cl.[5] G02B *6/10*

U.S. Cl. 350—96.14 18 Claims



1. A 1×2 integrated optical switch of rank k=n, where $0<n<15$, having a very high extinction ratio, comprising:

a first integrated cascaded coupled-waveguide modulator of rank k=n, having an input serving as the input of said switch and an output serving as a first output of said switch;

said first modulator being a bar-type modulator of n sections having a primary waveguide and a plurality of secondary waveguides;

a second integrated cascaded coupled-waveguide modulator of rank k=n, having an input and having an output serving as a second output of said switch;

said second modulator being a cross-type modulator of n sections, having a plurality of waveguides, each of which serves as a primary waveguide in one of said sections and as a secondary waveguide in the preceding section;

said first and second modulators being monolithically integrated such that the primary and secondary waveguides of the first section of said first modulator serve also as the primary and secondary waveguides of the first section of said second modulator, and said input of said first modulator is the input of said second modulator;

such that said first bar-type integrated cascaded coupled-waveguide modulator forms a straight-through path from said input to said first output, and said second cross-type integrated cascaded coupled-waveguide modulator forms a cross-over path from said input to said second output; and

such that the extinction ratio of said switch is the product of the average extinction ratio of a section of the modulator of said path times the rank of said modulator.

4,998,792

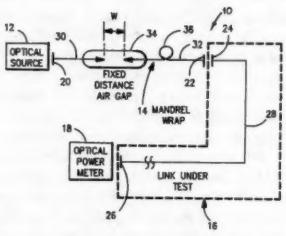
FIBER OPTIC MODE CONDITIONER

David W. Boerstler, Millbrook, and Daniel J. Stigliani, Jr., Hopewell Junction, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 16, 1990, Ser. No. 481,083

Int. Cl.[5] G02B *6/26, 6/42*

U.S. Cl. 350—96.15 20 Claims



1. A fiber optic mode conditioner comprising first and second fiber optic segments, each of said segments containing a fiber optic core of predetermined transverse dimension and having a first end and a second end, at least a portion of said second segment having a path curvature, said segments being arranged serially with the second end of said second segment at a spacing therefrom substantially greater than the transverse dimension of said cores, and means for introducing light into said first segment from the first end thereof.

4,998,793

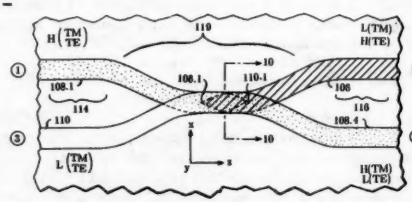
ADIABATIC POLARIZATION MANIPULATING DEVICE

Charles H. Henry, Montgomery Township, Somerset County; Rudolf F. Kazarinov, Martinsville, and Yosi Shani, Murray Hill, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 14, 1989, Ser. No. 437,049

Int. Cl.[5] G02B *6/26*

U.S. Cl. 350—96.15 19 Claims



1. A device for manipulating the polarization of lightwave signals comprising

a substrate,

first and second thin film waveguides supported by said substrate,

said first waveguide having a first core and a cladding surrounding said core and said second waveguide having a second core an a cladding surrounding said second core, characterized in that:

said waveguides have a first section which includes said first core,

said waveguides have a second section wherein said waveguides are optically decoupled and separate from one another,

said waveguides have a first transition section wherein said first and second cores overlap and then gradually separate so as to adiabatically couple said first section and second sections to one another, said first transition section being capable of supporting more than one transverse mode, and

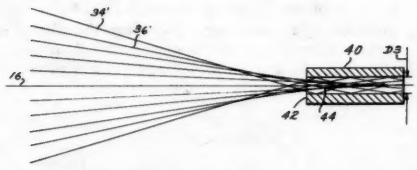
said first and second cores comprise different materials having different effective refractive indices, the refractive indices and dimensions of the cores being mutually adapted so that (1) when radiation is coupled into said first section, the TM mode is coupled to the first waveguide in the second section and the TE mode is coupled to the second waveguide in the second section, or (2) when a TM mode is coupled into said first waveguide and/or a TE mode is coupled into said second waveguide, said mode(s) combine in said transition section and propagate into said first section, or (3) when a TM mode is coupled into said second waveguide and/or a TE mode is coupled into said first waveguide, said mode(s) radiate out of said transition section so that no significant amount of energy from said modes propagates into said first section.

4,998,794

MENISCUS LENS FOR COUPLING AN EXCIMER BEAM INTO AN OPTICAL FIBER

Melvyn Holzman, Boulder, Colo., assignor to The Spectranetics Corporation, Colorado Springs, Colo.

Filed Oct. 27, 1989, Ser. No. 427,476
Int. Cl.[5] G02B *6/32*
U.S. Cl. 350—96.18 **23 Claims**



16. An optical system, comprising:

means for generating a substantially collimated beam;

a positive meniscus lens having a center axis and a paraxial focal length, the beam passing through the meniscus lens; and

optical fiber means, having an incident end to receive the beam passed through the meniscus lens, the incident end being supported along the center axis closer to the lens than the paraxial focal length,

the positive meniscus lens includes an edge and a center, the lens converging the beam so the portion of the beam passing through the edge of the lens is converged more rapidly than the portions of the beam passing through the lens closer to the center of the lens, the nonuniformly converged beam having a minimum converged cross section, and

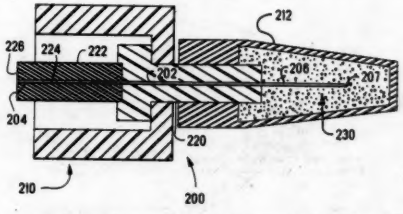
the incident end of the optical fiber means being supported at the minimum converged cross section.

4,998,795

REFLECTION-LESS TERMINATOR

Terry P. Bowen, Etters; Paul R. Reitz, Palmyra, and William K. Long, Bethel, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed May 12, 1989, Ser. No. 351,248
Int. Cl.[5] G02B *6/36*
U.S. Cl. 350—96.20 **16 Claims**



1. A terminator for terminating an unused first optical fiber to prevent undesired reflections, comprising:

a length of optical fiber of the same type as the first optical fiber to be terminated, said length of optical fiber having a front portion and a rear end,

a connector plug attached to the front portion of said length of optical fiber,

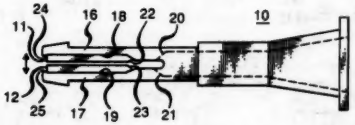
said connector plug containing a material which covers the rear end of said length of optical fiber, and which has substantially the same index of refraction as said length of optical fiber, and which absorbs substantially all radiation transmitted by the rear end of said length of optical fiber, and which includes an opaque filler that absorbs radiation transmitted from the front portion to the rear end of said length of optical fiber.

4,998,796

METHOD OF ASSEMBLING MULTI-GROOVED SILICON CHIP FIBER OPTIC TERMINATIONS

Rocco Bonanni, Wayne; William J. Parzygnat, Morris Township, Morris County, and Roger E. Weiss, Denville, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 27, 1990, Ser. No. 486,045
Int. Cl.[5] G02B *6/38, 6/40;* B32B *31/00*
U.S. Cl. 350—96.21 **10 Claims**



1. A method of fabricating optical connectors where an array of optical fibers is held within grooves formed in facing major surfaces of a pair of chips comprising the steps of:

providing a holder including said chips, said holder comprising a cantilevered section which aligns the chips but permits a variable space between the facing major surfaces of the chips.

inserting an array of optical fibers in the grooves in the facing surfaces of the chips:

clamping the chips so that the fibers are held within the grooves formed in the facing surfaces of the chips; and

bonding the facing surfaces of the chips together.

4,998,797

OPTICAL WAVEGUIDE PLUG CONNECTION

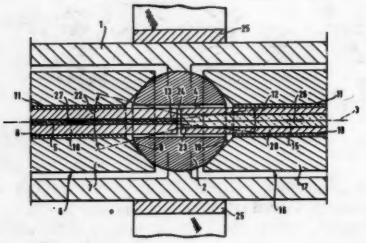
Hubert van den Bergh, Goumoens-la-Ville, and Georges Wagnières, Lutry, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Aug. 7, 1990, Ser. No. 563,771

Claims priority, application Switzerland, Aug. 14, 1989, 2977/89

Int. Cl.[5] G02B *6/38*

U.S. Cl. 350—96.21 12 Claims



1. An optical waveguide plug connection for feeding laser light from an incoming optical waveguide into an outgoing optical waveguide, said plug connection comprising a metallic plug housing equipped with a metallic centering element into which there project said incoming optical waveguide provided in a first plug and said outgoing optical waveguide provided in a second plug, the end faces of said incoming optical waveguide and said outgoing waveguide being arranged opposite each other with a small gap between them, wherein the core diameter of said outgoing optical waveguide is at least one third larger than the core diameter of said incoming optical waveguide and wherein said plug housing is connected to a housing of large surface area which dissipates heat.

4,998,798

ENCODER HAVING LONG LENGTH MEASURING STROKE

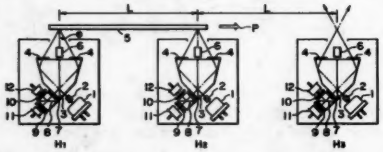
Koh Ishizuka, Urawa; Tetsuharu Nishimura, Kawasaki; Satoshi Ishii, Tokyo; Yoichi Kubota, Kawasaki, and Masaaki Tsukiji, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 3, 1989, Ser. No. 346,886

Claims priority, application Japan, May 10, 1988, 63-112734

Int. Cl.[5] G02B *27/02;* G01J *15/00*

U.S. Cl. 350—115 15 Claims



1. An encoder comprising:

first and second scale reading means arranged along a moving direction of a scale, each means generating a signal;

an adder to add said signals from said first and second reading means;

a binarizing circuit to binarize an output signal from said adder; and

a circuit to count a signal from said binarizing circuit.

4,998,799

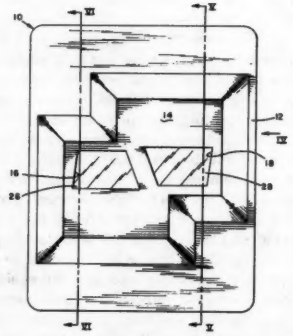
STEREOSCOPE

Dennis L. Brown, 328 Stow Rd., Harvard, Mass. 01451

Filed Dec. 4, 1989, Ser. No. 445,424

Int. Cl.[5] G02B *27/22*

U.S. Cl. 350—133 8 Claims



1. A stereoscope for viewing two stereoscopically complementary pictures which are positioned in the same vertical plane so that one picture is substantially above the other and the two pictures are at least partially vertically aligned, said stereoscope comprising:

(a) a housing having a front and a back,

(b) a left front window at the front of said housing,

(c) a right front window at the front of said housing which is horizontally spaced from said left front window and is at substantially the same height as said left front window,

(d) an upper rear window at the back of said housing,

(e) a lower rear window at the back of said housing which is substantially below said upper rear window,

(f) first optical means within said housing operatively connecting one of said rear windows to said left front window for receiving a first light image from one of said pictures through one rear window and for directing said first light image to said left front window, and

(g) optical means within said housing operatively connecting the other of said rear windows to said right front window for receiving a second light images from the other of said pictures through said other rear window and for directing said second light image to said right front window.

4,998,800

OPTICAL LOW PASS FILTER

Yasuaki Nishida, Tokyo; Katsuya Fujisawa, Okayama; Yoshihiro Fujita, Tokyo; Masao Fujiwara, Tokyo; Shigeo Yoshikawa, Tokyo, and Masao Uetsuki, Okayama, all of Japan, assignors to Nippon Hoso Kyokai, Tokyo and Kuraray Company, Ltd., Kurashiki, both of, Japan

Filed Apr. 3, 1989, Ser. No. 331,961

Claims priority, application Japan, Apr. 4, 1988, 63-83785

Int. Cl.[5] G02B *27/60*

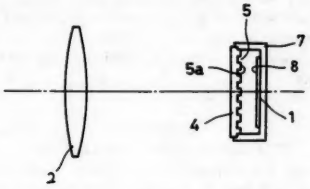
U.S. Cl. 350—162.2 8 Claims

1. An imaging device comprising: an objective lens;

a solid state image sensor having formed thereon a plurality of picture elements having a periodicity;

a diffraction grating disposed between the objective lens and the solid state image sensor, said diffraction grating projecting an image having a periodicity onto the solid state

image sensor by the objective lens, wherein the periodicity of the projected image of the diffraction grating is



selected to be twice or 1/n of the periodicity of the picture elements, wherein n represents an integer.

4,998,801

OPTICAL LOW-PASS FILTER AND PHOTOGRAPHIC SYSTEM USING THE SAME

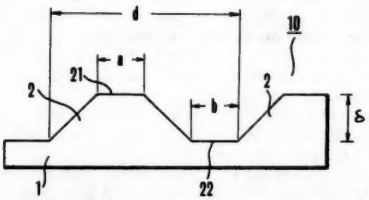
Akihiko Shiraishi; Kazuo Fujibayashi, both of Kanagawa, and Masatake Kato, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 13, 1989, Ser. No. 379,221

Claims priority, application Japan, Jul. 18, 1988, 63-178737; Dec. 14, 1988, 63-315851

Int. Cl.[5] G02B *5/18, 5/20;* H04N *9/07*

U.S. Cl. 350—162.2 **4 Claims**



1. An optical low-pass filter, satisfying the following conditions:

a profile of said filter being of a trapezoid wave form, and for a wavelength range of $\lambda_M \leqq 1.6\ \lambda m$,

$$\frac{\lambda_D - \lambda_m}{\lambda_M - \lambda_m} \geqq 0.3$$

$$0.35 \leqq \epsilon \leqq 0.65$$
$$-0.26 \leqq \mu \leqq 0.26$$

where

$$\epsilon = \frac{a+b}{d}, \quad \mu = \frac{a-b}{d}$$

$$\lambda_D = \mathrm{MIN}\left(\frac{2\mathrm{MIN}(a,b)}{d}, 1-\epsilon\right) \times \frac{2(n-1)\delta}{1-\epsilon}$$

wherein "a" is a width of a flat portion of a top side of said trapezoid wave form, "b" is a width of a flat portion of a bottom side thereof, "δ" is a height thereof, "d" is a length of one period thereof, "n" is a refractive index of a material of said filter, λ_M and λm are maximum and minimum wavelengths in a predetermined wavelength range respectively, and MIN(x,y) represents the smaller one of values which variables x and y take.

4,998,802

OBJECTIVE LENS DRIVING DEVICE IN AN OPTICAL PICKUP

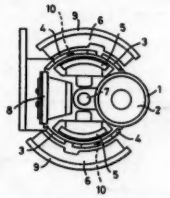
Ikuo Kasuga; Toru Kamada, and Fumio Kobayashi, all of Komagane, Japan, assignors to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, Japan

Filed May 25, 1989, Ser. No. 357,314

Claims priority, application Japan, Jun. 3, 1988, 63-136780; Jun. 16, 1988, 63-148463; Jun. 23, 1988, 63-155473

Int. Cl.[5] G02B *7/02*

U.S. Cl. 350—247 **18 Claims**



1. An objective lens driving device comprising:

a magnet for focusing and a magnet for tracking which are magnetized so as to be polarized in respective directions perpendicular to each other, and which are arranged on a continuous common surface; and

a driving coil for focusing and a driving coil for tracking, which are arranged on a common surface so as to be respectively facing said magnet for focusing and said magnet for tracking;

wherein an objective lens having an optical axis is moved in a first direction parallel to said optical axis by a thrusting force generated between said magnet for tracking and said driving coil for focusing and is moved in a second direction perpendicular to said optical axis by a thrusting force generated between said magnet for tracking and said driving coil for tracking, said magnet for focusing and said magnet for tracking being respective portions of a single body, wherein a portion of said body which connects said magnets is, on a side of said body facing said driving coils, more depressed than said portions which act effectively as said magnet for focusing and said magnet for tracking.

4,998,803

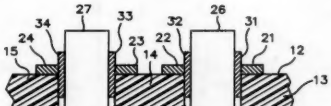
MOUNTING STRUCTURE FOR OPTICAL AND ELECTRO-OPTICAL COMPONENTS AND METHOD OF MAKING SAME

Michael M. Salour, La Jolla, and James H. Bechtel, San Diego, both of Calif., assignors to Tacan Corporation, Carlsbad, Calif.

Filed Apr. 13, 1989, Ser. No. 337,338

Int. Cl.[5] G02B *6/12*

U.S. Cl. 350—321 **68 Claims**



37. Apparatus for mounting electro-optical components, said apparatus comprising:

a substrate having a component receiving surface on one side thereof;

a relief pattern of lands and grooves formed on said component receiving surface;

electrode means on said substrate adapted to selectively make electrical contact with the components; and

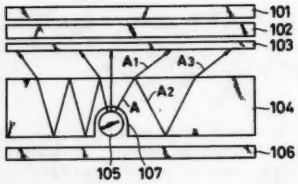
at least one optical or electro-optical component mounted in said grooves and selectively making electrical connection with said electrode means.

4,998,804

TRANSMISSIVE LIQUID CRYSTAL DISPLAY DEVICE

Kenji Horiuchi, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 5, 1989, Ser. No. 361,402
Claims priority, application Japan, Aug. 29, 1988, 63-214674
Int. Cl.[5] G02F *1/13*
U.S. Cl. 350—334 7 Claims



1. A transmissive liquid crystal display device comprising

a liquid crystal display cell,

a light scattering plate disposed behind said display cell,

a light diffusing film disposed behind said light scattering plate,

a light source lamp and a reflective plate disposed behind said light diffusing film, said reflective plate serving to direct backward propagating light from said source lamp towards said liquid crystal display cell, and

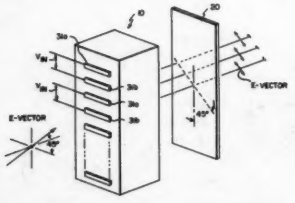
a transparent plate disposed between said light diffusing film and said light source lamp, said transparent plate having at least one indentation each shaped correspondingly to the shape of said light source lamp, said light source lamp being contained inside said indentation, wherein emitted light from said source lamp reaches said light diffusing film both by directly passing through said transparent plate and by undergoing internal reflections inside said transparent plate.

4,998,805

ELIMINATION OF FIELD-INDUCED INSTABILITIES IN ELECTROOPTIC MODULATORS

John A. Agostinelli, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 702,542, Feb. 19, 1988, abandoned.
This application May 2, 1988, Ser. No. 203,515
Int. Cl.[5] G02F *1/01*
U.S. Cl. 350—355 9 Claims



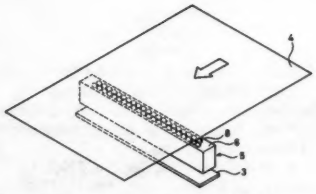
9. In an electooptic modulator array for use in a light valve device and including a PLZT substrate formed of electrooptic material which changes its birefringence in response to an electric field; an plurality of electrodes spaced across a surface of said substrate to define a plurality of pixel portions in such substrate, said electrodes being responsive to voltage signals to establish through selected ones of said pixel portions electric fields which cause each of said selected pixel portions to change the plane of polarization of a light beam, the improvement comprising a moisture impermeable, electrically insulating, optically isotropic, transparent layer which has been formed on said substrate surface pixel portions after a moisture removal heating of said surface, whereby moisture-induced field instabilities are substantially eliminated during operation of said array.

4,998,806

IMAGE READING APPARATUS

Shigeki Tsuji, Hiroshima; Yukio Kurata, Nara, and Taizo Yokota, Hiroshima, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 28, 1989, Ser. No. 458,442
Claims priority, application Japan, Jan. 6, 1989, 1-1678
Int. Cl.[5] G02B *3/08*
U.S. Cl. 350—413 8 Claims



1. An image reading apparatus comprising:

a light source for illuminating a surface of an object with illumination light;

a lens array for focusing light reflected on the surface of said object, transmitting the reflected light and forming an image of said object at a predetermined position; and

an image sensor provided at said predetermined position for converting said image formed on the surface thereof into an electrical signal to read said image of said object,

said lens array comprising

a transparent base having an incident plane in which said reflected light enters and an emission plane from which said reflected light emits,

a first diffraction element provided at a position in which said reflected light on the side of the incident plane of said base enters, and

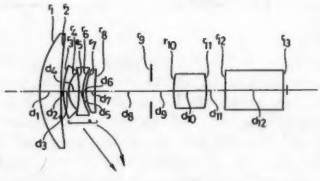
a second diffraction element provided at a position from which said reflected light on the side of the emission plane of said base emits.

4,998,807

VARIABLE FOCAL LENGTH LENS SYSTEM

Tsutomu Uzawa; Atsujiro Ishii, and Norihiko Aoki, all of Tokyo, Japan, assignors to Olympus Optical Co. Ltd., Tokyo, Japan

Filed Aug. 23, 1989, Ser. No. 397,247
Claims priority, application Japan, Aug. 23, 1988, 63-207290
Int. Cl.[5] G02B *15/14*
U.S. Cl. 350—423 9 Claims



1. A variable focal length lens system comprising:

a plurality of lens units separated from each other by respective airspaces; and
an aperture stop;
one lens unit being located on the most image side among said lens units, said one lens unit having positive refractive power and a function of image formation;
the focal length of said lens system being variable by changing at least one of said airspaces;
said one lens unit including a radial GRIN lens component;
said aperture stop being on the object side of said one lens unit; and
the refractive index of said GRIN lens being expressed by the formula shown below and satisfying the following conditions (2) and (3),

$$n(r) = n_0 + n_1r^2 + n_2r^4 + \dots$$
$$(2)\quad -2 < n_1(d) \cdot f_G^2 < 0.5$$
$$(3)\quad -0.5 < n_2(d)Df_G^3 < 2$$

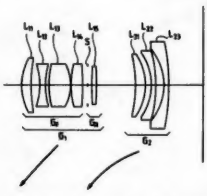
where the reference symbol n_0 represents the refractive index of said GRIN lens on its optical axis, the reference symbol r represents the radial distance from the optical axis, the reference symbols n_1, n_2, . . . being the coefficients of refractive index distribution, the reference symbols $n_1(d)$, $n_2(d)$ representing the coefficient value of n_1, n_2 corresponding to the line "d" of the GRIN lens, reference symbol D representing the thickness of said GRIN lens on its optical axis, and the reference symbol f_G representing the focal length of said GRIN lens.

4,998,808

COMPACT ZOOM LENS

Atsushi Shibayama, Kawasaki, Japan, assignor to Nikon Corporation, Tokyo, Japan

Filed Jul. 13, 1990, Ser. No. 552,422
Claims priority, application Japan, Jul. 18, 1989, 1-186277; Sep. 14, 1989, 1-239553
Int. Cl.[5] G02B *15/14, 9/64*
U.S. Cl. 350—427 **4 Claims**



1. A compact zoom lens having, in the order from the object side, a first lens group G_1 of a positive refractive power and a second lens group G_2 of a negative refractive power and effecting zooming operation by varying the distance of said lens groups;
wherein said first lens group G_1 comprises, in the order from the object side, a front group G_F of a positive refractive power and a rear group G_R of a positive refractive power;
said front group G_F having, in the order from the object side, a positive meniscus lens L_{11} with a convex face directed to the object side, a negative lens with a concave face directed to the object side, a positive lens component L_{13} and a positive lens component L_{14};
said rear group G_R having a positive lens L_{15};
wherein said second lens group G_2 comprises, in the order from the object side, a positive meniscus lens L_{21} with a convex face directed to the image side, a negative lens L_{22}, and a negative meniscus lens L_{23} with a concave face directed to the object side; and
said zoom lens further satisfying following conditions:

$$-0.8 < f_2/f_W < -0.6 \quad (1)$$

$$2.6 < f_R/f_F < 8 \quad (2)$$

$$0.45 < f_{14}/f_W < 1.26 \quad (3)$$

$$-1.1 < f_{22}/f_W < -0.7 \quad (4)$$

$$1.5 < Q_{11} < 5 \quad (5)$$

$$-0.5 < Q_{12} < 1.3 \quad (6)$$

$$-1.8 < Q_{13} < 1 \quad (7)$$

$$-3 < Q_{21} < -2 \quad (8)$$

$$1.2 < Q_{23} < 1.8 \quad (9)$$

$$34 < \nu_{12} < 55 \quad (10)$$

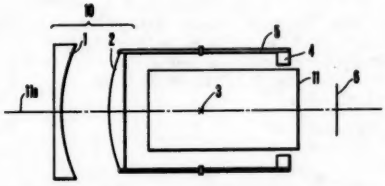
wherein:
f_W: focal length of entire zoom lens at the wide angle end thereof;
f_2: focal length of said second lens group G_2;
f_F: focal length of said front group G_F;
f_R: focal length of said rear group G_R;
f_{14}: focal length of positive lens component L_{14} in said front group;
f_{22}: focal length of negative lens L_{22} in said second lens group;
Q_{11}: shape factor of positive meniscus lens L_{11} in said front group;
Q_{12}: shape factor of negative lens L_{12} in said front group;
Q_{13}: shape factor of positive lens component L_{13} in said front group;
Q_{21}: shape factor of positive meniscus lens L_{21} in said second lens group;
Q_{23}: shape factor of negative meniscus lens L_{23} in said second lens group; and
ν_{12}: Abbe's number of negative lens L_{12} in said front group.

4,998,809

IMAGE-STABILIZING OPTICAL DEVICE

Sadahiko Tsuji; Hiroyuki Hamano, both of Kanagawa; Hirokazu Mogi, Saitama; Shigeru Ogino, Tokyo; Kazuhiro Noguchi, Kanagawa, and Takashi Kobayashi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 8, 1990, Ser. No. 490,471
Claims priority, application Japan, Mar. 11, 1989, 1-58669; Mar. 11, 1989, 1-58670; Mar. 11, 1989, 1-58671; Mar. 14, 1989, 1-61284; Mar. 14, 1989, 1-61285; Mar. 14, 1989, 1-61286; Mar. 14, 1989, 1-61287; Mar. 14, 1989, 1-61288
Int. Cl.[5] G02B *27/64, 7/02*
U.S. Cl. 350—500 **8 Claims**



1. An image-stabilizing optical device comprising:
from front to rear,
a first lens group having a negative refractive power;
a second lens group having a positive refractive power; and
a rear lens group having a positive refractive power to form an image,
wherein said second lens group, while being freely held, rotates around a support point which is spaced from an image-side principal point of said second lens group toward the image side by a distance approximately equal to

$\beta 2 \cdot f1/(1-\beta 2)$

where $\beta 2$ is the image magnification of said second lens group and f1 is the focal length of said first lens group, and lies within said rear lens group.

4,998,810

ILLUMINATING DEVICE FOR AN OPERATION MICROSCOPE

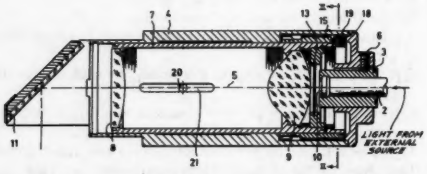
Ulrich Sander, Oberkochen, and Klaus Biber, Aalen, both of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heindenheim/Brenz, Oberkochen, Fed. Rep. of Germany

Filed Oct. 2, 1989, Ser. No. 416,059

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1988, 3833877

Int. Cl.[5] G02B *21/06*

U.S. Cl. 350—528 **11 Claims**



1. An illuminating device for an operation microscope having a viewing field determined by a variable-enlargement system and a main objective, said illuminating device comprising:

(a) a light guide having a light-exit surface on an optical axis of illumination, which axis passes through said main objective, to the exclusion of passing through said variable enlargement system;

(b) an illuminating optical system for imaging said light-exit surface via said objective in the viewing field of the operating microscope, said optical system comprising a convergent lens and an aspheric lens in spaced relation on said axis;

(c) a diaphragm on said axis and interposed between said optical system and said light-exit surface; and

(d) selectively operable actuating means for displacing said optical system along said axis.

4,998,811

TELESCOPIC RIFLE SIGHT WITH AUTOMATIC SETTING OF THE ELEVATION BY AN ELECTROMOTOR

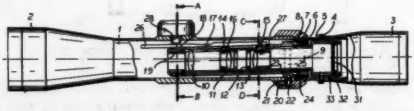
Walter Basta, Zanaschkagasse 12/29/3, A-1220 Wien, Austria

Filed Dec. 18, 1986, Ser. No. 944,410

Claims priority, application Austria, Dec. 18, 1985, 3667/85

Int. Cl.[5] G02B *23/00, 15/16*

U.S. Cl. 350—560 **9 Claims**



1. The telescopic rifle sight, comrising:

a main telescope tube having a sighting end and an objective and;

an objective lens system in said main tube at said objective end;

an inner tube received in said main telescope tube and provided with means for mounting said inner tube between ends thereof to swing relative to said main tube at least in a vertical plane;

a cam tube rotatable on said inner tube and swingable therewith;

a variable enlargement optical system in said inner tube and including at least one axially displaceable lens have a lens ring, and a displacement screw directly connected to said lens ring and axially entrained by said lens for axially displacement of said displacement screw by said lens ring, said displacement screw being engaged by a cam surface of said cam tube for displacement upon rotation of said cam tube;

a setting ring rotatable on said main telescope tube and operatively connected with said cam tube for rotating same to set the telescopic sight for different object distances;

an elevation-setting screw on said main telescope tube extending into said main tube for adjusting an angular position of said inner tube in said plane; and

a linear generally wedge-shaped cam element extending along said inner tube, connected directly to said displacement screw and passing between said elevation-setting screw and said inner tube for automatically setting the elevation of said sight upon axial displacement of said lens ring and said axially displaceable lens of said lens system to vary the enlargement of said optical system.

4,998,812

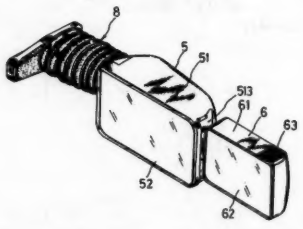
TELESCOPIC EXTERIOR REAR VIEW MIRROR

Mei-Wen H. Hou, No. 200, Fu-Chiang Road, Sec. 2, Yung Kang Shiang, Tainan Hsien, Taiwan

Continuation-in-part of Ser. No. 378,980, Jul. 12, 1989, Pat. No. 4,907,871. This application Jul. 16, 1990, Ser. No. 552,468

Int. Cl.[5] G02B *5/08;* B60R *1/06*

U.S. Cl. 350—604 **2 Claims**



1. A telescopic exterior rear-view mirror for motor vehicles comprising:

a first side mirror device having a housing defining an inner chamber and carrying a first mirror, said housing having a first side wall, and a second side wall opposed to the first side wall, said second side wall having an opening formed therethrough;

secure means for securing the housing to the body of the motor vehicle;

a first ball joint connector rotatably adjustably interconnecting the secure means and the first side wall of the housing;

rail means transversely arranged in the housing;

a second mirror device having a frame member carrying a second mirror facing a direction substantially corresponding to that of the first mirror, adapted to be stored in the chamber of the housing of the first side mirror device, having a lagging side wall and leading side wall respectively corresponding to the first side wall and the second side wall of the housing and movable between a retracted position in the housing and an extended position through the opening in the second side wall of the housing;

an intermediate body having a lagging side and a leading side respectively corresponding to the lagging side wall

and leading side wall of the frame member of the second side mirror device;

hook members spacedly and integrally formed on a lagging side wall of the intermediate body;

a second ball joint assembly connector rotatably adjustably interconnecting the leading side of the intermediated body and the lagging side wall of the frame member of the second side mirror device;

a slide member adapted to be slidably engaged in the rail means and attached to the intermediate body for sliding the second side mirror device between a retracted position and an extended position;

a spring unit disposed between the first side wall of the housing and the lagging side of the intermediate body for expelling the second side mirror device from the retracted position into the extended position;

a pair of retaining members opposedly formed on the first side wall of the housing and having respective recesses for retaining two end portions of a spring; and

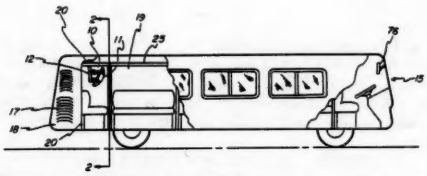
a lock and release means having a partition board extending across the parallel horizontal side walls of the housing and having opposite recesses, locking members having hook members for engaging the hook members on the intermediate body as the second side mirror is located in its retracted position and means to release the engagement between the hook members between the locking members and the intermediate body.

4,998,813

MIRROR SYSTEM FOR PASSENGER BUSES

Philip A. Reynolds, P.O. Box 139, Hide-A-Way Hills, Ohio 43107, and Frank E. Reynolds, 19767 S.R. 4, Marysville, Ohio 43040

Filed Aug. 4, 1988, Ser. No. 228,072
Int. Cl.[5] G60R *1/04*; G02B *7/18*
U.S. Cl. 350—624 **19 Claims**



1. In a mirror system for passenger buses of the type including a rear mounted convex mirror for permitting the driver to observe the activities of passengers in the rear of the bus merely by looking into a conventionally mounted rear view mirror, the improvement comprising:

a vibration damped mirror assembly and a mirror bracket assembly mounted directly to the support structure of the overhead handrail system of the bus,

said mirror assembly comprising:

an acrylic convex mirror,

a fiberglass backing member,

a gasket for coupling the mirror to the backing member at the edges thereof, and

a plurality of pedestals mounted on said backing member for connecting the mirror assembly to the bracket assembly,

said bracket assembly including:

a horizontal rail member extending across the rear of the bus from a handrail mounting member on one side to the handrail mounting member on the other side,

three vertical bars extending downwardly from said horizontal rail member, said vertical bars being connected to the pedestals, and

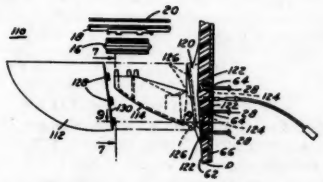
a horizontal stabilizing member connecting the bottom ends of said vertical bars.

4,998,814

EXTERIOR REARVIEW MIRROR ASSEMBLY

William M. Perry, Palestine, Ohio, assignor to Sheller-Globe Corporation, Detroit, Mich.

Filed Feb. 12, 1990, Ser. No. 478,631
Int. Cl.[5] G02B *7/18*
U.S. Cl. 350—632 **32 Claims**



1. An exterior rearview mirror assembly for an automotive vehicle comprising:

a shell housing;

means for mounting said housing on a door panel of the vehicle;

a mirror;

a mirror mounting mechanism for supporting said mirror; and

a mirror mounting bracket for supporting said mirror mounting mechanism and said mirror within said shell housing, wherein said mounting bracket comprises a body, means for securing said body to a door panel for a vehicle such that said bracket extends in a cantilever fashion from said door panel and means for attaching the rearview mirror to said body;

said mounting means comprising a mounting flange integral and on one end of said shell housing having at least three integral bosses projecting from said flange and mountable on the door panel of the vehicle;

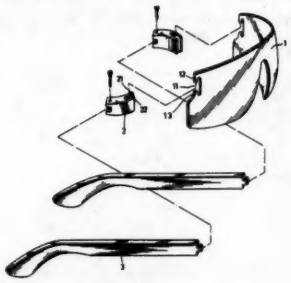
said body of said mirror mounting bracket having a triangular shaped cross section having first and second side walls forming a cavity.

4,998,815

SUNGLASS FRAME STRUCTURE

David J. T. Lin, No. 2, Alley 24, Lane 9, Sec. 1, Nei Hu Road, Taipei, Taiwan

Filed Sep. 27, 1989, Ser. No. 413,033
Int. Cl.[5] G02C *1/04*
U.S. Cl. 351—106 **1 Claim**



1. A sunglass, including

a piece of glass made of resilient material through shape molding process, comprising two notches at both sides defining therein a pair of snap ends respectively;

a pair of fastening elements made of resilient material through shape molding process in a curved trapezoid shape comprising a thinner end for connection thereto of

either one of a pair of spectacle bows, and a thicker end having an opening made thereon to define externally two opposite side walls and internally an upper and a lower retaining recess; and

a pair of spectacle bows respectively connected to said fastening elements at the thinner end;

wherein said pair of fastening elements are respectively set in said two notches of said piece of glass with the upper and lower retaining recesses of each fastening element respectively engaged with the pair of snap ends of each notch of said piece of glass.

4,998,816

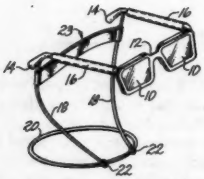
ATTACHMENT FOR SPECTACLES

Jean-Albert Eggenberger, and Edith Eggenberger, both of P.O. Box 604, Fort Langley, British Columbia V0X 1J0, Canada

Continuation-in-part of Ser. No. 308,321, Feb. 8, 1989, abandoned. This application Dec. 5, 1989, Ser. No. 446,481

Int. Cl.[5] G02C *3/02*

U.S. Cl. 351—156 **11 Claims**



1. An attachment to assist in holding spectacles on the head of a wearer, the spectacles having eye pieces and ear pieces, the attachment comprising:

at least one anchor member to grip the ear pieces of the spectacles;

a retaining member extending from said at least one anchor member;

a neck band to be received around the neck of the wearer; and

means attaching the retaining member to the neck band.

4,998,817

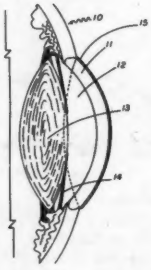
CONTACT LENS FOR CORRECTION OF COLOR BLINDNESS

Harry I. Zeltzer, 107 High St. - P.O. Box 209, Ipswich, Mass. 01938

Continuation of Ser. No. 731,763, May 8, 1985, abandoned, which is a continuation of Ser. No. 559,969, Dec. 9, 1983, abandoned. This application May 10, 1990, Ser. No. 522,067

Int. Cl.[5] G02C *7/04*

U.S. Cl. 351—162 **1 Claim**



1. A soft corneal contact lens which improves the color discrimination of a color-blind person when applied to one eye only, said lens comprising a clear, soft, corneal contact lens having on the central portion of its exterior surface a thin layer of red coloration characterized as being insoluble in water but soluble in aromatic hydrocarbon; light passing through the red layer having substantially all its transmissions above about 6000 Å; said red layer continuously covering substantially all the light normally admitted to the pupil of the eye during the daytime and being in line with the axis of the pupil; said lens being sufficiently large to enable ready and stable centration without jeopardizing oxygen transmission.

4,998,818

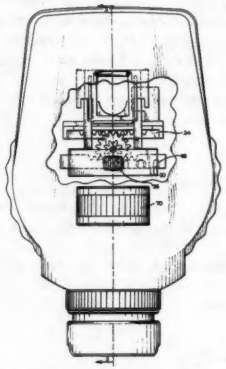
OPHTHALMOSCOPE WITH LINEAR POLARIZER

Andrew J. Kugler, Syracuse, and Thaddeus J. Wawro, Auburn, both of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Aug. 23, 1989, Ser. No. 397,269

Int. Cl.[5] A61B *3/10*

U.S. Cl. 351—205 **15 Claims**



1. In an ophthalmoscope having a housing, a viewing passage therethrough, and an illumination source positioned to project a beam of light through said viewing passage; means for selectively modifying the light projected through said passage and the light observed through said passage comprising:

a frame member mounted in said housing adjacent the viewing passage and the illumination source beam of light;

a plurality of light filtering members disposed in said frame member; and

single actuating means for selectively positioning said frame member to align one light filtering member in the illumination source beam of light and another light filtering member in said viewing passage.

4,998,819

TOPOGRAPHY MEASURING APPARATUS

Richard Labinger; Timothy F. Macri, both of Trumbull; Paul R. Yoder, Jr., Wilton, and David J. Valovich, Bridgeport, all of Conn., assignors to Taunton Technologies, Inc., Monroe, Conn.

Continuation-in-part of Ser. No. 125,240, Nov. 25, 1987, Pat. No. 4,902,123. This application May 4, 1989, Ser. No. 347,348

Int. Cl.[5] A61B *3/10*

U.S. Cl. 351—212 **36 Claims**

1. A contour measuring apparatus to measure the three-dimensional contour of a surface, comprising:

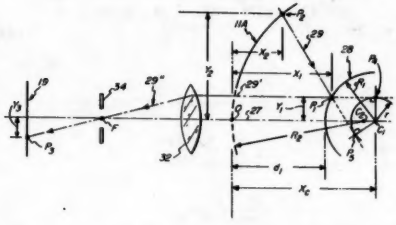
a multi-point light source to direct a plurality of individual light beams each corresponding to individual light points of the multi-point light source onto the surface being measured;

said multi-point light source comprising first and second

groups of individual light points; the individual light points of the first group being interspersed between the individual light points of the second group;

means for sequentially pulsing on said first and second groups;

photodetector means receiving reflections of the first and second groups of individual light beams from said surface being measured for generating first and second groups of



electrical output signals corresponding to electro-optically measurable optical images, each of said optical images corresponding to one of said light points;

means receiving said first and second groups of electrical output signals from said photodetector for measuring the position of each optical image in the photodetector and for determining the average radius of curvature of the measured surface.

4,998,820

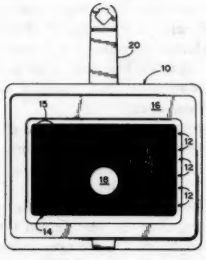
INSTRUMENT AND METHOD FOR USE IN OPTOMETRIC EXAMINATIONS

Cosmo Salibello; Jonathan G. Torrey; Steven G. Coffman, and Gerald M. Murch, all of Portland, Oreg., assignors to Applied Vision Concepts, Inc., Portland, Oreg.

Filed Dec. 12, 1988, Ser. No. 282,596

Int. Cl.[5] A61B *3/02*

U.S. Cl. 351—243 **3 Claims**



1. An optical system for use in conducting optometric examinations on patients who suffer from eye fatigue due to the use of VDT displays, said system comprising:

(a) a light source including a parabolic shaped cavity having a viewing means extending therethrough for allowing a medical practitioner conducting an optometric exam to view the patient's eyes during the exam, and a plurality of light emitting means, said light emitting means being disposed in said cavity at a plurality of focus locations of said cavity;

(b) a plurality of pixel means for defining alphanumeric characters in terms of pixel-like light elements in a manner similar to a VDT using light from said source; and

(c) means for modifying the spatial light distribution profile of the light elements defining said alphanumeric characteristics in order to simulate the characteristics of pixels presented on a VDT display.

4,998,821

PROJECTION APPARATUS

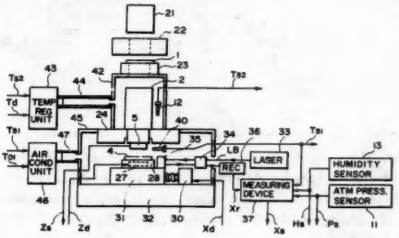
Masakatsu Ohta, Tokyo; Shuichi Yabu, Kawasaki, and Junichi Murakami, Kamakura, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 127,594, Dec. 2, 1987, which is a continuation of Ser. No. 42,953, Apr. 27, 1987, abandoned, which is a continuation of Ser. No. 684,792, Dec. 21, 1984, abandoned. This application Jul. 13, 1988, Ser. No. 220,440

Claims priority, application Japan, Oct. 19, 1984, 59-218571; Dec. 7, 1984, 59-258562

Int. Cl.[5] G03B *27/34*

U.S. Cl. 353—122 **10 Claims**



1. An apparatus for projecting through a lens system having a focus position, a pattern formed on a first object onto a second object, said pattern being projected at a magnification, said apparatus comprising:

first sensing means for sensing the distance between a reference point on said lens system and the second object, and for producing an output corresponding to the sensed distance;

second sensing means for sensing ambient conditions that can change the focus position of said lens system, and for producing an output corresponding to the sensed ambient conditions, said second sensing means sensing the ambient temperature, ambient gas pressure, and humidity;

means for detecting the amount of change of the focus position of said lens system on the basis of the output from said second sensing means;

adjusting means for adjusting the distance between the reference point on said lens system and the second object on the basis of the outputs from said first sensing means and said detecting means; and

means for maintaining the magnification of the pattern projected through said lens system at a constant value, wherein said maintaining means includes means for adjusting the ambient temperature of said lens system, which temperature adjusting means is effective to correct a magnification error caused by a change in ambient gas pressure and humidity.

4,998,822

ROTATION RATE NULLING SERVO AND METHOD FOR FIBER OPTIC ROTATION SENSOR

James R. Steele, Northridge, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Continuation of Ser. No. 31,323, Mar. 27, 1987, abandoned. This application Dec. 27, 1988, Ser. No. 296,121

Int. Cl.[5] G01B *9/02*

U.S. Cl. 356—350 **19 Claims**

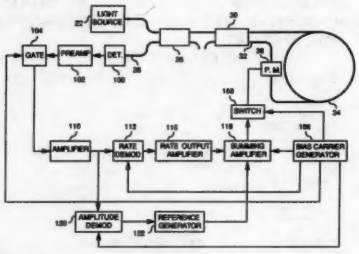
1. Apparatus for processing signals output from a fiber optic rotation sensor that guides a pair of counterpropagating light waves in a sensing loop of optical fiber and combines the waves to produce an interference pattern indicative of the phase difference between the waves comprising:

detector means for producing a detector signal indicative of the phase difference of the waves;

phase modulator means for modulating the phase of light waves in the sensing loop;

means responsive to the detector signal for controlling the phase modulator means with a modulating signal for nulling the detector signal, the modulating signal producing stepped modulations in the phase of light waves in the sensing loop;

gating means connected to an output of the detector means;



rate demodulating means connected to an output of the gating means for determining the rate of rotation; and

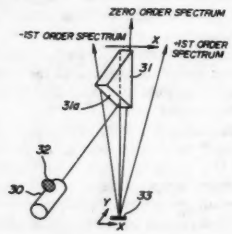
amplitude demodulating means connected to the output of the gating means for adjusting the calibration of the rate demodulator.

4,998,823

TWO-DIMENSIONAL POSITION DETECTING METHOD AND APPARATUS

Hironobu Kitajima, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Sep. 11, 1989, Ser. No. 405,293
Claims priority, application Japan, Sep. 12, 1988, 63-227759
Int. Cl.[5] G01B *9/02*
U.S. Cl. 356—356 **18 Claims**



1. A two-dimensional position detecting method for detecting a two-dimensional position of an object which has a diffraction grating provided thereon, said diffraction grating comprising a first grating portion which extends in a first direction and a second grating portion which extends in a second direction which is perpendicular to the first direction, said two-dimensional position detecting method comprising the steps of:

scanning the first grating portion of the diffraction grating in the second direction by a coherent light;

detecting by a photosensor an mth order spectrum which is generated by a diffraction of the coherent light caused by the first grating portion, where m is an integer;

scanning the second grating portion of the diffraction grating in the first direction by the coherent light; and

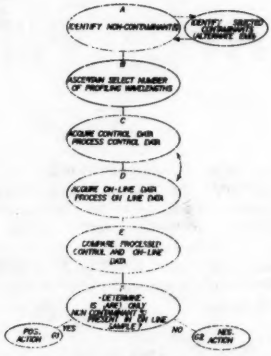
detecting by said photosensor a spread of a zero order spectrum which is generated by a diffraction of the coherent light caused by the second grating portion, thereby detecting the two-dimensional position at an intersection of the first and second grating portions of the diffraction grating.

4,998,824

SYSTEM OF FLUID INSPECTION AND/OR IDENTIFICATION

Douglas J. Littlejohn, Santa Clara; Douglas Modlin, San Mateo County, both of Calif.; Jerry G. Ingrum, Fulton County, Ga., and Brian R. Devlin, Balwin County, Ala., assignors to International Integrated Systems, Inc., Opelika, Ala.

Division of Ser. No. 181,160, Apr. 13, 1988, abandoned. This application Jun. 8, 1989, Ser. No. 363,049
Int. Cl.[5] G01N *21/31, 21/85;* B07C *5/10*
U.S. Cl. 356—407 **3 Claims**



1. Fluid inspection method, comprising the steps of:

a. directing light from a light source at a fluid to be tested;

b. creating a relative movement between the light source and the test fluid;

c. collecting light after absorption of at least some of the light by the test fluid; which collecting includes the step of collecting light at a plurality of test times within a predetermined test period;

d. separating the collected light into a plurality of parts, each part having a pre-selected, characteristic wavelength;

e. detecting the relative intensity of the collected light at each of the selected wavelengths, at each of the test times, thereby defining a first category of data including, at least, coordinates of relative light intensity and test times for each selected wavelength;

f. processing said first category of data to define at least a second category of data, which second category of data includes at least one of the following: (1) peak relative intensity ("PI") during the test period for each selected wavelength ("λ"); or (2) the sum of the relative intensities of all test times over the test period ("∈I") for each selected wavelength; or (3) the area under a curve (" ") plotted by the coordinates of the first category for each selected wavelength; or (4) maximum average intensity ("AvI") over the test period for each selected wavelength; and

g. processing said second category of data to define at least a third category of data, which third category of data includes data defined by normalizing second category data of each selected wavelength to second category data of one of the selected wavelengths as in the manner of $PI\lambda_2/PI\lambda_2$ and $PI\lambda_3/PI\lambda_2$ and $PI\lambda_n/PI\lambda_1$, or $\epsilon I\lambda_2/\epsilon I\lambda_1$ and $\epsilon I\lambda_3/\epsilon I\lambda_1$ and $\epsilon I\lambda_n/\epsilon I\lambda_1$, or λ_2/λ_2 and λ_3/λ_2 and λ_n/λ_2, or $AVI\lambda_2/AvI\lambda_1$ and $AvI\lambda_3/AvI\lambda_1$ and $AvI\lambda_n/AvI\lambda_1$; and

h. comparing the data for the test fluid to similar data for a control sample of a known fluid;

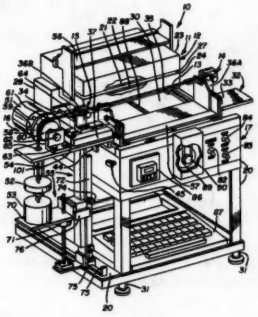
i. determining from the comparison whether or not the tested fluid is unacceptably contaminated.

4,998,825

TIRE CORD THERMAL ANALYSIS TESTING DEVICE AND METHOD

Sudhendra V. Hublikar, Olmsted Falls, and Leonard G. Kinaitis, Hinckley, both of Ohio, assignors to The Uniroyal Goodrich Tire Company, Akron, Ohio

Filed Nov. 13, 1989, Ser. No. 435,729
Int. Cl.[5] G01B 5/02; G01N 3/08, 3/16
U.S. Cl. 374—50 13 Claims



1. A device for determining dimensional change in a material under thermomechanical stress, comprising:

chamber means for receiving and controlling the temperature of a preselected length of the material;

grip means for holding said preselected length of the material, selectively positioning the entire said preselected length of the material within said chamber means and selectively retracting the entire said preselected length of material from said chamber means; and,

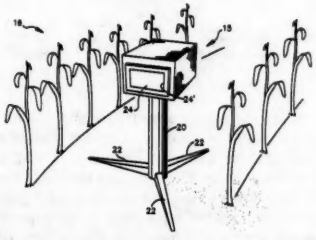
means for measuring changes in said preselected length of material.

4,998,826

AGRICULTURAL INFRARED THERMOMETER

Don E. Wood, Irvine, and Wayne Scharf, Silverado, both of Calif., assignors to Telatemp Corporation, Fullerton, Calif.

Filed Nov. 30, 1988, Ser. No. 278,754
Int. Cl.[5] G01J 5/10; G01K 7/00, 1/14
U.S. Cl. 374—129 12 Claims



1. An agriculture thermometer for measuring the temperature of a crop growing in a field, the crop emitting infrared radiation in an amount dependent upon the temperature of the crop, said thermometer comprising:

an infrared detector for sensing the amount of infrared radiation emitted from the crop;

means for defining a substantially elongated oval field of view for radiation incident upon the infrared detector, said elongated oval field of view having a width at least four times its height; and an aperture having a size and shape to substantially exclude infrared radiation not within said field of view, said aperture having a stationary position with respect to the crop.

11. A method of measuring crop temperature, comprising the steps of:

first providing an infrared detector mounted on a rotating turntable;

said infrared detector and said rotating turntable being located within a stationary housing;

second, sweeping the turntable through a selected angle of rotation;

third, integrating the output of the infrared detector substantially simultaneously with the sweep of the second step; and

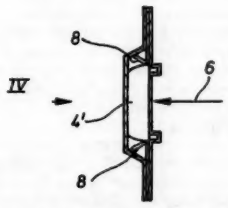
fourth, providing an output responsive to the crop temperature.

4,998,827

COLD INDICATOR FOR CONTROLLING THE COOLING OR FREEZING OF FOODS, MEDICINES AND THE LIKE

Walter Holzer, Drosteweg 19, 7758 Meersburg, Fed. Rep. of Germany

Filed May 22, 1989, Ser. No. 355,824
Claims priority, application Fed. Rep. of Germany, May 20, 1987, 3716972
Int. Cl.[5] G01K 11/08
U.S. Cl. 374—160 5 Claims



1. Cold indicator for indicating the freezing/thawing condition of goods including goods in the use of which it is put in heat conducting contact with the goods, comprising,

a pair of opposed sheets secured together, including a first sheet and a second sheet, having chambers with their open sides mutually opposed,

at least the second sheet being transluecent in the area of the chamber therein,

a thin breakable separating sheet positioned between the opposed sheets,

the chamber in the first sheet being smaller than the chamber in the second sheet, and there being a freezable fluid in that smaller chamber,

at least the first sheet being yieldable in reponse to mechanical pressure applied against it from outside the indicator substantially at the location of the smaller chamber in the first sheet,

the separating sheet being breakable under that pressure and enabling the freezable fluid, when frozen, to be moved thereby into the larger chamber in the second sheet, and

the chamber in the second sheet being devoid of any other materials thereby enabling the frozen fluid to move freely and fully into that chamber effectively into engagement with the second sheet without any other materials therebetween.

4,998,828

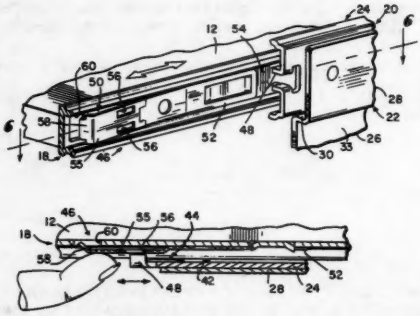
OVER AND UNDER TELESCOPING SLIDE ASSEMBLY

James D. Hobbs, Plainfield, Ind., assignor to General Devices Co., Inc., Indianapolis, Ind.

Filed Oct. 2, 1989, Ser. No. 416,054

Int. Cl.[5] A47B *88/16*

U.S. Cl. 384—18 2 Claims



1. An over and under telescoping slide assembly for supporting a movable drawer in a cabinet, the slide assembly comprising

a stationary cabinet slide member for mounting on the cabinet,

a drawer slide member for carrying the drawer, and

an intermediate slide member including a support bracket slidably connected to the cabinet slide member and an outer section fixed to the support bracket form movement therewith, the outer section being formed to include channel means having a bottom wall and outwardly extending flanges for receiving the drawer slide member therein, an supporting means retained in the channel means for slidably supporting means drawer slide member in the channel means to permit sliding movement of the drawer slide member relative to the outer section from a retracted position in the outer section to a release position with the drawer slide member partially extending from the intermediate slide member, and where receiving means includes a flexible stop mounted to the bottom wall of said drawer slide member and biased outward from the bottom wall to lockingly engage a lug mounted on the outer section, with said receiving means being releasable to allow the drawer slide member and a drawer mounted thereon to be disconnected from the outer section of the intermediate slide member without removing the supporting means from the channel means in response to exit of the drawer slide member from the channel means at the release position.

4,998,829

ROTARY DIE SLOT ADJUSTABLE GIB ASSEMBLY

Larry J. Greer, Chesterfield, Mo., assignor to Allied Gear and Machine Co., Inc., St. Louis, Mo.

Filed Oct. 24, 1988, Ser. No. 261,917

The portion of the term of this patent subsequent to Aug. 22, 2006, has been disclaimed.

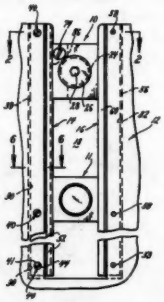
Int. Cl.[5] F16C *23/00*

U.S. Cl. 384—255 6 Claims

1. An adjustable gib assembly slot for a rotary die journal bearing block, comprising:

(a) support means including a bearing block slot having opposed first and second sides, each of said sides having elongate groove means,

(b) opposed first and second elongate gib members each associated with one of said first and second sides, each gib member including a first portion received by its associated groove means, and a second bearing block engageable portion, and



(c) means connecting said first and second gib members to said slot sides, said means connecting said first gib member including means moving said first portion of first gib member into and out of said groove means to vary the distance between the second portions of said gib members.

4,998,830

DEVICE FOR SUPPORTING ARM DRIVING SHAFTS OF INDUSTRIAL ROBOT

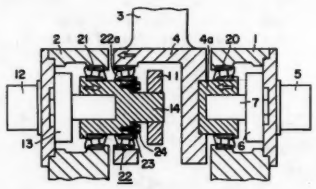
Syuichi Tounai, and Toshiaki Iwanaga, both of Kitakyushu, Japan, assignors to Kabushiki Kaisha Yaskawa Denki Seisakusho, Fukuoka, Japan

Filed Oct. 3, 1989, Ser. No. 416,135

Claims priority, application Japan, Oct. 7, 1988, 63-131943[U]

Int. Cl.[5] F16C *19/36;* B25J *17/00*

U.S. Cl. 384—563 7 Claims



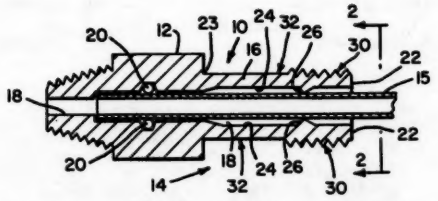
1. A device for supporting arm-driving shafts of an industrial robot having articulations wherein a driving shaft of a first arm and a driving shaft of a second arm are arranged in an axial alignment, first and second bearings are provided for supporting a supporting frame of the first arm and the driving shaft of the second arm on a pair of supporting posts, respectively, and a third bearing is provided for supporting an end of the supporting frame of the first arm on the driving shaft of the second arm, characterized in that each of said bearings is made into a type in which an axial force applied to either one of inner and outer races of the bearings beforehand presses rolling members of the bearings toward the other of the races, a race of a single bearing among these bearings is slidably secured to either one of the driving shaft and the supporting frame, a pressing plate and a plurality of adjusting screws are provided for applying an axial force to the slidably secured race, while the other race of the single bearing and the inner and outer races of other bearings are fixedly secured to their positions.

4,998,831

FORCE CONCENTRATING UNITARY FITTING

Oscar Proni, Hollywood, Fla., assignor to Proni Creations Inc., Miami, Fla.

Continuation of Ser. No. 73,637, Jul. 15, 1987, abandoned. This application Aug. 9, 1989, Ser. No. 391,386
Int. Cl.[5] F16L *21/06*
U.S. Cl. 285—322 20 Claims



1. A fitting assembly for attachment to a conduit designed for the flow of fluids under pressure therein, said assembly comprising:

a. a fitting body including a base and a segmented portion secured to said base and extending outwardly therefrom to a distal end of said body,

b. a passage means for receiving the conduit formed within said fitting body and extending from said base and said segmented portion and exiting substantially at said distal end,

c. said segmented portion comprising a plurality of spaced spaced apart elongated segments each secured to said base and extending outwardly therefrom and terminating at free ends common to said distal end and collectively disposed in surrounding relation to said passage,

d. each of said segments comprising an outer surface extending along its length and including a first portion and a second portion, said first portion extending no greater than substantially two-thirds the length of each segment from said free end thereof toward said base and spaced from said base,

e. said second portion of each segment extending from said base along the length of each segment to said first portion,

f. a gripping means formed on an inner surface of each segment a spaced distance from said free end thereof and structured and disposed for gripping engagement with an outer surface of a conduit within said passage means,

g. a support means formed on the inner surface of each segment at said free ends,

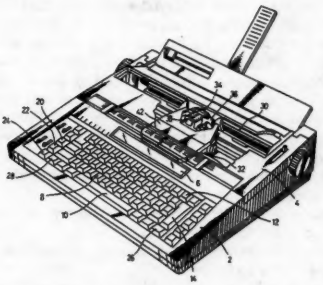
h. force applying means securable to said segmented portion in force transferring engagement with said first portion of each segment for concurrent application of an external force to said plurality of segments causing said gripping means to penetrate said conduit in a gripping arrangement and said support in supporting relationship, said first portion of each segment having a threaded configuration along its length, said force applying means comprising an internally threaded structure dimensioned to concurrently engage said threaded configuration of said first portions of said plurality of segments in force transferring relation thereto and said force applying means further comprising a proximal end disposed in abutting engagement with said base when said gripping means is in said gripping arrangement.

4,998,832

DOCUMENTATION SYSTEM HAVING PAGE FORMAT FUNCTION

Satoshi Okimoto, Komaki; Yukiharu Fujikawa, Nagoya; Naoki Otsuka, Konan, and Miyuki Sato, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Mar. 24, 1989, Ser. No. 328,484
Claims priority, application Japan, Mar. 29, 1988, 63-75573
Int. Cl.[5] B41J *11/44, 19/68*
U.S. Cl. 400—76 7 Claims



1. A documentation system having a page format function wherein a desired number of input area beginning positions can be designated in a given documentation area, comprising:

designating means for designating input area beginning position information;

storing means for storing said input are beginning position information designated by said designating means;

left margin controlling means for retrieving one of said input area beginning position information stored in said storing means and for controlling a left margin of said documentation area according to said retrieved information; and

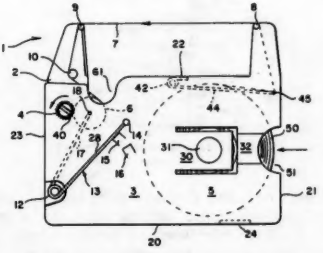
indent mode setting means for activating said left margin controlling means.

4,998,833

REFILLABLE INK RIBBON CARTRIDGE FOR USE IN AN ELECTRONIC TYPEWRITER

Hwang Chiman, 28606 Pacific Hwy. So. 65, Federal Way, Wash. 98003

Filed Jan. 17, 1990, Ser. No. 466,584
Int. Cl.[5] B41J *32/00*
U.S. Cl. 400—208 13 Claims



1. A refillable ink ribbon cartridge for use in an electric typewriter and a printer, which comprises:

a case housing including a casing base, a casing top cover, a rear wall, a feed spool side wall having a feed spool side opening, and a front side wall having a front side opening,

a changeable feed spool engaged within said case housing, said changeable feed spool having a hub and provided with a feed spool holding plate having a center hole and a feed spool guide channel disposed on the top surface of

said case housing, respectively, for being located in parallel,

a semi-global member assembled with said hub of said feed spool for slidably inserting in the center hole of said feed spool holding plate, said semi-global member being provided with a plurality of legs and a center and pin receptacle further provided with a plurality of slots disposed in the bottom thereof,

an ink ribbon,

a replaceable winding spool engaged within said case housing in the vicinity of said changeable feed spool for winding the ink ribbon received from said feed spool, said replaceable winding spool provided with a fixed pin supported on said casing base and a V-shaped pivotal connecting spring about said fixed pin defining a pair of arms for connecting to a hub of the winding spool through one of said arms, and a plurality of apertures and a center leg disposed therein for mating with the plurality of legs and the center pin receptacle of the semi-global member so as to convert the winding spool to the feed spool,

a lever being the other of said arms and disposed on the top surface of said case housing,

a plurality of stoppers disposed on the top surface of said casing house for locking and releasing said lever,

means for transferring the ink ribbon from said feed spool to said winding spool, and

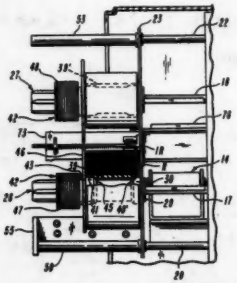
a drive roller having a jagged wheel disposed within said case housing and in the vicinity of said winding spool for maintaining tension on the ink ribbon on the winding spool, whereby the feed spool inserted into and removed from the ribbon cartridge through the feed spool side opening and the winding spool can be replaced after removal of the used ink ribbon wound about the winding spool so that the used cartridge can be reused and maintains a certain tension on the ink ribbon between the feed spool and winding spool.

4,998,834

SLIDE ASSEMBLY FOR MOUNTING A PRINT RIBBON

Bruce E. Taylor, Tipp City, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Oct. 20, 1989, Ser. No. 424,788
Int. Cl.[5] B41J *33/12*
U.S. Cl. 400—247 **26 Claims**



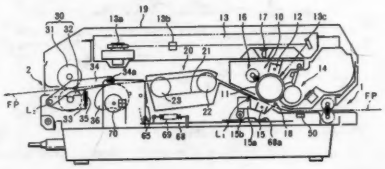
1. A printer including a frame, a print head mounted on the frame, a platen cooperable with the print head to print on a record medium, the print head and the platen being relatively movable between an open position in which the print head and the platen are spaced apart to provide clearance space and a printing position in which the print head and the platen cooperate with the record medium and an inking ribbon to effect printing on the record medium, a supply roll spindle, a driven take-up spindle, means for guiding the inking ribbon along a path from the supply roll spindle, into alignment with the clearance space and to the take-up spindle, means for mounting the spindles and the guide means on the frame for movement as a unit only between an inking ribbon loading and unloading position and an operating position, whereby an inking ribbon supply roll can be loaded onto the mounting means so that the inking ribbon is aligned with the clearance space when the mounting means, the spindles and guide means are in the loading and unloading position, and whereby the mounting means, the spindles, the guide means and the inking ribbon supply roll are movable to the operating position to bring the inking ribbon into the clearance space.

4,998,835

COMPUTER CONTROLLED TIMER FOR MAIN DRIVE PULSE OF FORM FEED MOTOR

Kiyoshi Negishi; Ikuo Negoro, and Masahiro Kita, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 14, 1989, Ser. No. 436,024
Claims priority, application Japan, Nov. 14, 1988, 63-286990
Int. Cl.[5] B41J *11/26*
U.S. Cl. 400—611 **12 Claims**



1. A device for feeding a continuous form provided in a printer, said device comprising;

means for feeding said continuous form, said feeding means having a pulse motor operating in accordance with a drive pulse to feed said continuous form;

means for measuring a feeding speed of said continuous form relative to a printing speed of said printer; and

means for driving said pulse motor, said driving means outputting said drive pulse to said pulse motor, said driving means having a timer measuring a constant time by counting clock signals to a first predetermined number, a counter counting interruptions to said timer for a second predetermined number, said interruptions being made at intervals at which said timer has counted said clock signals to said first predetermined number, a means for changing a time measured by said timer by changing a number of clock signals counted by said timer in accordance with a control signal input from said measuring means when a number of interruptions counted by said counter becomes equal to said second predetermined number, and a means for determining a width of said drive pulse by summing up a time obtained by multiplying said constant time by said second predetermined number and adding said time changed by said changing means.

4,998,836

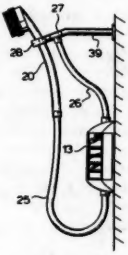
VENTURI LINE OPERATED SOAP BRUSH

Mark Scripnick, 401 Mountjoy South, Timmins, Ontario, Canada P4N 1V4

Filed Apr. 28, 1989, Ser. No. 344,661
Int. Cl.[5] A46B *11/06*
U.S. Cl. 401—42 **4 Claims**

1. A shower stall arrangement comprising a shower stall wall, a standard threaded shower arm, a liquid soap dispenser mounted to said shower stall wall, a connector member on said shower arm, a first hose from said connector member to said liquid soap dispenser, a wash brush, and a second hose from said liquid soap dispenser to said wash brush, said connector member being threadably secured without permanent modification to said shower arm, said liquid soap dispenser having a venturi feed including a valve which is responsive to a preset water flow rate for operation of said valve and venturi feed,

the arrangement being such that water flowing through said first hose to said dispenser at and above said predetermined flow rate opens said valve to operate said venturi and draw liquid soap from said dispenser to form a soap and water mixture which is fed through said second hose to said wash brush, said valve in said venturi feed remaining closed when the water flowing through said dispenser is below said predetermined rate to provide water only to said brush.

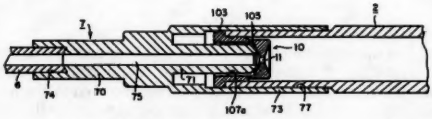


4,998,837

LEAD CARTRIDGE WITH AN OPENABLE CAPPING STRUCTURE

Hidehei Kageyama, and Yoshihide Mitsuya, both of Kawagoe, Japan, assignors to Kotobuki & Co., Ltd., Kyoto, Japan

Continuation of Ser. No. 219,894, Jul. 14, 1988, abandoned, which is a continuation of Ser. No. 865,782, May 22, 1986, abandoned. This application May 12, 1989, Ser. No. 353,151
Claims priority, application Japan, May 23, 1985, 62-75697
Int. Cl.[5] B43K *21/00*
U.S. Cl. 401—85 **10 Claims**



1. A lead cartridge comprising:

a cartridge body for being detachably fitted into a mechanical pencil having a lead guide, said lead guide being provided with a rearwardly extending cylindrical portion adapted to guidingly receive a single lead, said cartridge body having an open front end and a diameter sufficient to receivably contain a plurality of leads therein; and

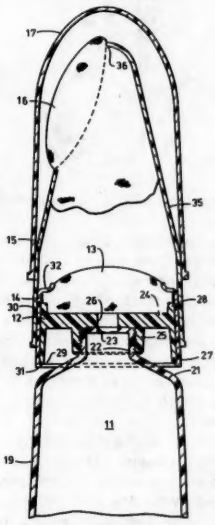
closure means, fixed to said lead cartridge intermediate said cartridge body and said lead guide, for releasably sealing said cartridge body, said closure means being releasably movable between a first position and a second position, said closure means in said first position preventing extension out of said cartridge body of any of said plurality of leads contained therein, said closure means in said second position permitting any single lead of said plurality of leads contained in said cartridge body to pass out of said cartridge body into said lead guide, said closure means being resiliently biased to said first position, said closure means and said rearwardly extending cylindrical portion of said lead guide cooperating to hold said closure means in said second position when said cartridge body is fitted into said mechanical pencil, wherein said closure means comprises abutting means, defined by tapered surfaces formed at a rear end of said closure means, for abutting said rearwardly extending cylindrical portion of said lead guide, said rear end of said closure means being cylindrically shaped and disposed within said open front end of said cartridge body.

4,998,838

COVER MAKE-UP DISPENSER

Tammy J. Cancelosa, 17613 Kingsbrook Cir., Mt. Clemens, Mich. 48044, and Tammy J. Matthews, 62 B Clubhouse La., Fairfield, Ohio 45014

Filed Aug. 24, 1990, Ser. No. 571,789
Int. Cl.[5] A45D *34/00*
U.S. Cl. 401—202 **10 Claims**



1. A dispenser for the convenient application of a facial cover make-up without contact of the cover make-up on the hands or fingers of the user, said dispenser comprising:

(a) a container for holding liquid cover make-up, said container having an opening for dispensing purposes and further having pliable side walls such that the container's contents can be readily forced from the container through the opening;

(b) a reservoir base positioned on the container and in communication with the container's opening, said base having a main body with an upper annular flange extending therefrom to create an open top reservoir and further having a passageway through the base which is aligned with the opening in the container so as to receive the liquid cover make-up when forced from the container;

(c) an applicator sponge positioned in the open to reservoir of the reservoir base, said sponge capable of becoming substantially evenly saturated with the liquid cover make-up;

(d) a retainer means positioned on the reservoir base to hold the applicator sponge such that a substantial portion of the applicator sponge remains exposed yet is retained in place during use;

(e) a removable blender pad base comprised of a hollow housing dimensioned to sit over the applicator sponge and onto the reservoir base to effectively cover the applicator sponge during non-use and a blender pad permanently mounted in the housing, said blender pad base dimensioned to be held in the hand and capable of blending the cover make-up into the facial area in an efficient manner; and

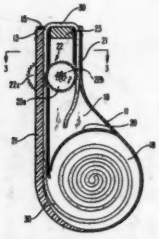
(f) a removable cover cap dimensioned to fit over the removable blender pad base to cover the blender pad during non-use and retain said pad in a moist state.

4,998,839

APPLICATOR FOR NAIL POLISH REMOVER

Irfan Bashir, 23-74 29th St. - Apt. 15, Astoria, N.Y. 11105

Filed Mar. 16, 1990, Ser. No. 494,503
Int. Cl.[5] A45D *34/00, 34/04;* B05C *17/02*
U.S. Cl. 401—208 6 Claims



1. A portable applicator for liquid nail polish remover comprising

a hollow elongated housing member having a first chamber formed at the bottom end of said housing member, a second chamber formed adjacent to said first chamber, an opening formed at the top end of said housing member, and a channel which communicates with said first chamber and said second chamber via the opening formed at the top of said housing member, said first chamber and said second chamber being separated by a flexible membrane that is attached at one point to a side wall of said housing member;

a coiled strip of wetted absorbent material disposed within said first chamber having axial portions thereof feedable through said channel to said second chamber;

means for manually feeding axial portions of said strip of absorbent material past said opening into said second chamber; and

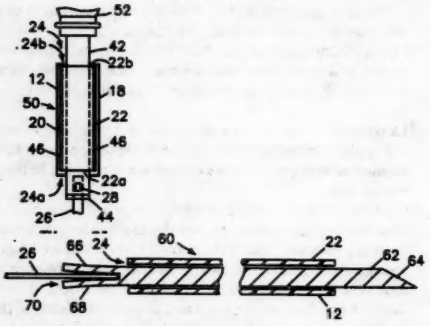
a cap for the top end of said housing member.

4,998,840

METHOD AND TOOL FOR RETROFITTING AN ELONGATED LABEL LEADER INTO THE SLOT OF AN OVERLAY BINDER

Paul E. Ruble, 249 Devia Dr., Newbury Park, Calif. 91320

Filed Jun. 12, 1990, Ser. No. 537,056
Int. Cl.[5] B42F *1/00;* B42D *19/00*
U.S. Cl. 402—3 20 Claims



1. A method for inserting a label leader into a slot defined between a cover of a bound work and a transparent overlay which is sealed along its longitudinal edges to an outer surface of the cover, the slot having first and second transverse ends, the label leader being longer and narrower than the slot, the method comprising the steps of:

(a) providing a leader insertion tool which is longer and narrower than the slot, and sufficiently thin and rigid to be easily pushed and pulled through the slot;

(b) pushing the tool into the slot such that first and second end portions of the tool protrude from the first and second transverse ends of the slot respectively;

(c) releasably attaching an end of the leader to the first end portion of the tool;

(d) gripping the second end portion of the tool and pulling the tool out of the slot through the second transverse end thereof such that the leader is pulled into the slot through the first transverse end thereof and said end of the leader protrudes from the second transverse end of the slot; and

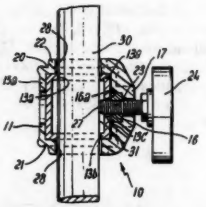
(e) releasing said end of the leader from the first end portion of the tool.

4,998,841

CLAMPS AND CLAMP ASSEMBLIES

Melvyn Wilde, Unit 1A, Empress Industrial Estate, Anderton Street, Wigan, England

Filed Feb. 15, 1989, Ser. No. 310,390
Claims priority, application United Kingdom, Feb. 19, 1988, 8803961; Sep. 8, 1988, 8821099
Int. Cl.[5] F16B *7/10*
U.S. Cl. 403—104 13 Claims



11. A clamp assembly comprising a hollow member having wall structure defining an aperture for receipt of a first elongate member, said first elongate member received in the hollow member, the hollow member having opposed walls with aperture means in said opposed walls for receipt of a second elongate member, said second elongate member extending through the aperture means of the hollow member and through the first elongate member transverse to the first elongate member, said aperture means permitting transverse relative movement between the second elongate member and the opposed walls toward and away from each other, and a rotatable clamp element in threaded engagement with the hollow member and in clamping engagement with the second elongate member for urging the second elongate member into clamping engagement with the first elongate member and the first elongate member into clamping engagement with the hollow member.

4,998,842

OVERCENTER COLLET SPACE STATION TRUSS FASTENER

Philip L. Sheridan, Raleigh, N.C., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 30, 1990, Ser. No. 516,856
Int. Cl.[5] B25G *3/00*
U.S. Cl. 403—252 18 Claims

1. A quick-connect fastener arranged to be coupled to a member having an opening extending between its outer and inner surfaces and comprising:

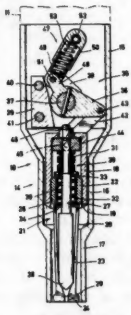
a body arranged to be engaged with an outer surface of

another member so that a selected axis of said body will be aligned with an opening in that other member;

a tubular collet on said body and arranged for axial movement along said axis, said collet including forwardly-projecting flexible fingers with enlarged forward portions sized to pass through an opening in another member so long as said fingers are contracted inwardly;

means on said body and said collet defining the forward position of said collet; and

means operable for advancing said forward portions of said fingers through an opening in another member and then expanding them outwardly after passing through that opening including an expander movably arranged on said body for engaging said fingers, a force-transmitting member movably mounted on said expander, actuating means arranged between said force-transmitting member and



said body for movement to an extended position for moving said force-transmitting member forwardly along said expander, first biasing means arranged between said expander and said force-transmitting member operable in response to movement of said actuating means toward said extended position for urging said expander against said fingers and shifting said collet to its said forward position to advance said inwardly-contracted forward portions of said fingers through an opening in that member and then radially expand said fingers after their forward portions have passed though the opening, and second biasing means arranged between said expander and said force-transmitting member and operable in response to movement of said actuating means to said extended position for urging said expander against said fingers to retain said body in engagement with that other member.

4,998,843

MODULAR ANTI-INTRUSION BARRIER

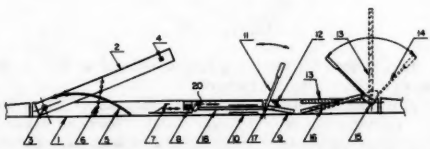
Gérard Mothe, 146 rue Stéhélin, 33200 Bordeaux, France

Continuation of Ser. No. 229,168, Jul. 5, 1988, abandoned. This application Apr. 24, 1990, Ser. No. 517,477

Claims priority, application France, Nov. 4, 1986, 86 15444

Int. Cl.[5] E01F *13/00, 15/00*

U.S. Cl. 404—6 **10 Claims**



1. Modular anti-intrusion barrier, comprising a single body which is, at one and the same time, an access-control barrier and a stop-barrier, linked to each other by a release mechanism, which activates the stop-barrier allowing, once loaded, an instantaneous, extremely high-powered action, and by the fact that it is placed on the ground

wherein the loading of the modular anti-intrusion barrier is assured by the lowering of the stop-barrier, which tightens the spring, and by the fact that the stop-barrier is maintained flush by a bolt, the movement of the control barrier into a vertical position being obtained by activating a manoeuvering lever operatively connected only with said control barrier.

4,998,844

WAVE ACTUATED COASTAL EROSION REVERSAL SYSTEM FOR SHORELINES

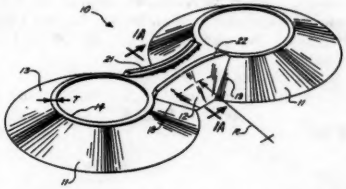
William J. Mouton, New Orleans; Robert Grush, Metairie, and Dolores B. Alton, New Orleans, all of La., assignors to Charles C. Garvey, Jr., River Ridge, La., a part interest

Continuation of Ser. No. 300,793, Jan. 23, 1989, Pat. No. 4,896,996. This application Jan. 30, 1990, Ser. No. 472,624

The portion of the term of this patent subsequent to Oct. 30, 2007, has been disclaimed.

Int. Cl.[5] F02B *3/06*

U.S. Cl. 405—21 **16 Claims**



1. A wave actuated erosion control, accretion collection system comprising:

(a) a matrix of generally circular rings-like elements each having an inclined continuous thin sidewall with an outer surface and an inner surface defining a hollow interior with an internal horizontal cross-section that decreases between the bottom and top of the ring-like element for trapping sedimentary material, the ring-like element having upper and lower respective continuous edges defining respectively an upper smaller opening and lower larger base portion with a downwardly facing opening, and the sidewall outer surface having a slope between the lower edge and the upper edge of between about thirty and forty-five degrees (30°–45 °); and

(b) connection means between adjacent ring for maintaining the ring-like elements in a matrix.

4,998,845

OIL CONTAINMENT SYSTEM FOR EMERGENCY USE

Richard D. Smith, 5 Commonwealth Rd., Natick, Mass. 01760

Filed Dec. 29, 1989, Ser. No. 458,898

Int. Cl.[5] E02B *15/06*

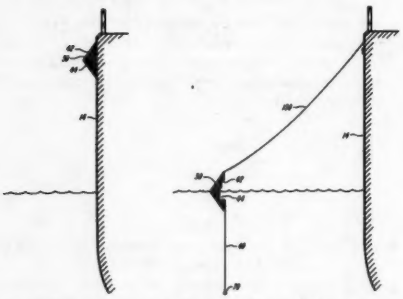
U.S. Cl. 405—66 **26 Claims**

1. A system for containing a contaminant leaking into water, comprising:

a plurality of flotation members connectable end to end, each flotation member having a storage recess therein; and

a flexible membrane comprising a compactable sheet attached to the flotation members within the storage recess,

the flexible membrane depending from the flotation members when the system is deployed in the water, and the flexible membrane being compacted within the storage recess of each flotation member when the system is stored.

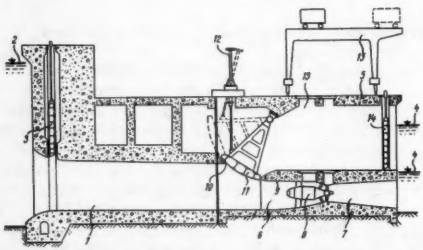


4,998,846

CONCRETE DAM BOTTOM DISCHARGE WORKS

Jury I. Evstratov, Vyazemsky pereulok, 6, kv. 110; Viktor V. Kononov, ulitsa Lenskaya, 9, korpus 2, kv. 10; Oleg L. Sandigursky, ulitsa Budapeshtskaya, 19, korpus 2, kv. 68; Mikhail T. Nerovny, prospekt M.Toreza, 40, korpus 1, kv. 4; Sergei V. Larionov, Aviatsionnaya ulitsa, 18, kv. 76, and Oleg I. Evstratov, ulitsa Pinegina, 21/26, kv. 18, all of Leningrad, U.S.S.R.

Filed Jan. 23, 1990, Ser. No. 468,595
Claims priority, application U.S.S.R., Jan. 26, 1989, 4641769
Int. Cl.[5] E02B *9/08*
U.S. Cl. 405—78 6 Claims



1. Bottom discharge works of a concrete dam separating the head-race and the tail-water areas, comprising:

a bottom water conduit incorporated within said concrete dam,

gates mounted in said bottom water conduit,

an attached block adjoining to said bottom water conduit at said tail water end and having an upper portion and a lower portion,

a turbine chamber including an area where it joins said bottom water conduit and further, including a ceiling, an opening being provided in said ceiling in said junction area between the turbine chamber and said bottom water conduit,

a gate mounted in said opening of the turbine chamber,

a hydroelectric unit mounted in said turbine chamber,

a draught tube connected with the turbine chamber, said turbine chamber and said draught tube being located in said lower portion of the attached block,

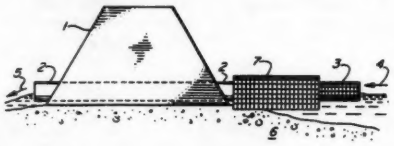
a water discharge chute having an outlet to said tail-water area and provided in said upper portion of the attached block, said opening made in the ceiling of said turbine chamber representing an inlet to said water discharge chute.

4,998,847

DRAINAGE CONDUIT WHICH IS RESISTANT TO CLOGGING BY BEAVERS

Neil J. Thurber, 3219 Coleman Road N.W., Calgary, Alberta T2L 1G6, Canada

Continuation-in-part of Ser. No. 234,099, Aug. 19, 1988, abandoned. This application Mar. 22, 1989, Ser. No. 327,395
Int. Cl.[5] E02B *8/00*
U.S. Cl. 405—127 12 Claims



1. In combination with a conduit for water flow via a watercourse through a man-made structure, a device to prevent obstruction of said conduit by beavers, said device comprising:

an elongated cylindrical element having an axis and being made of a mesh or screen material which is attached to or secured in close proximity to the upstream end of said conduit, said elongated element projecting upstream of the conduit, said elongated element being of a size sufficient to fit the opening of said upstream end of said conduit, the upstream end of said elongated element being closed by a mesh or screen element, the mesh or screen having openings of sufficient size to allow normal flow of water therethrough; and

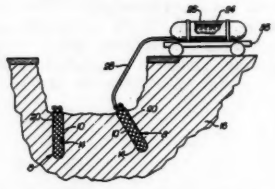
an inverted U-shaped element made of said open mesh, the inverted U-shaped element having an axis and being disposed to overlay said elongated element so that the axis of the U-shaped element is substantially parallel to the axis of the elongated element and so that said U-shaped element is separated from the elongated element by a distance of approximately 6 to 12 inches.

4,998,848

METHOD AND APPARATUS FOR REMOVING GROUND CONTAMINANTS

Robert G. Hansen, Goleta, Calif., assignor to R. G. Hansen & Associates, Santa Barbara, Calif.

Filed Mar. 27, 1989, Ser. No. 329,183
Int. Cl.[5] B09B *1/00*
U.S. Cl. 405—128 28 Claims



1. A method for removing fluid contaminants from a solid material comprising the steps of:

providing a container having a surface across which fluid contaminants can enter, said container for holding a cryo-adsorbing substance adjacent said surface, said substance having a cryo-adsorbing capability with respect to fluid contaminants to be removed;

placing said cryo-adsorbing substance in said container adjacent said surface;

placing said surface of said container adjacent to a solid material from which fluid contaminants are to be removed; and

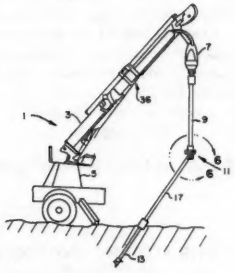
cooling said cryo-adsorbing substance with respect to said solid material below the temperature at which said substance is efficiently cryo-adsorbing with respect to said fluid contaminants so that fluid contaminants are adsorbed by said substance and removed from said solid material.

4,998,849

EARTH ANCHOR DRIVING AND REMOVING APPARATUS AND METHOD THEREFORE

Eugene R. Summers, Rte. 3, Box 190, Roodhouse, Ill. 62087

Filed Sep. 12, 1990, Ser. No. 581,055
Int. Cl.[5] E02D *5/80*
U.S. Cl. 405—303 **13 Claims**



1. A Kelly drive bar adapter for use with earth anchor driving machinery for driving an earth anchor into the earth at any desired angle or for removing said anchor from the earth, the adapter being connected to a Kelly bar which, in turn, is drivingly connected to a drive motor suspended from a movable boom of a service truck or the like, said adapter comprising:

a pair of spaced apart walls defining a channel of sufficient width to receive a portion of an earth anchor or an extension thereof, said channel being open on at least one side;

means for pivotally connecting said portion of said earth anchor to said adapter regardless of the angle between the axis of said earth anchor and said Kelly bar thereby to permit said Kelly bar and/or said anchor to be readily moved into colinear alignment; and

means for holding said Kelly bar and said earth anchor in axial alignment with one another for driving said earth anchor into the earth in coaxial alignment with the Kelly bar.

4,998,850

GEL DISPENSING APPARATUS AND METHOD

Terry M. Crowell, Twin Lakes, Wis., assignor to Park Corporation, Barrington, Ill.

Continuation-in-part of Ser. No. 266,797, Nov. 3, 1988, abandoned. This application Feb. 9, 1990, Ser. No. 477,623
Int. Cl.[5] B67D *5/08*
U.S. Cl. 406—48 **29 Claims**

1. A dispensing apparatus of the type usable to dispense gel detergent to a washing apparatus, the gel dispensing apparatus comprising in combination:

(a) a uniformly dissolvable detergent gel concentrate;

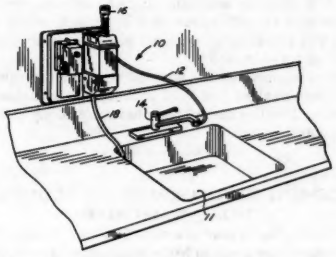
(b) means for containing the gel concentrate;

(c) valve means for receiving the gel concentrate from a gel inlet and mixing the gel concentrate with a fluid from a fluid inlet to deliver the mixture to a valve outlet;

(d) means for delivering gel concentrate from the containing means to the gel inlet;

(e) means for delivering fluid to the fluid inlet; and

(f) means for receiving fluid and gel solution from the valve outlet when the fluid delivering means delivers fluid under pressure into the fluid inlet, the gel delivering means



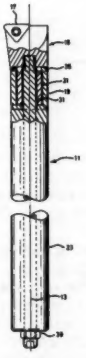
delivers gel concentrate to the gel inlet, and the valve means mixes the fluid with the gel concentrate.

4,998,851

VIBRATION DAMPENED BORING BAR

Carl E. Hunt, Davisburg, Mich., assignor to GTE Valenite Corporation, Troy, Mich.

Continuation-in-part of Ser. No. 132,086, Dec. 11, 1987, abandoned. This application Jun. 22, 1989, Ser. No. 370,137
Int. Cl.[5] B23B *27/00*
U.S. Cl. 408—143 **15 Claims**



1. A boring bar having a longitudinal axis comprising a head section adapted to receiving a cutting insert,

a hollow cylindrically shaped cemented carbide section,

a cylindrically shaped intermediate section having an interior hollow portion, said intermediate section positioned intermediate said head section and said cemented carbide section,

a first connection formed at the juncture of said intermediate section and said head section,

a second connection formed at the juncture of said intermediate section and said cemented carbide section,

a drawbar connected between said head portion and said cemented carbide section for holding said sections in axial alignment along said axis, said drawbar being under tension for holding said intermediate section and said first and said second connections under a compressive force,

said drawbar and said cemented carbide section being provided with mating precision surfaces for centering said drawbar relative to the rearward section for preventing relative radial movement between the forward end of said drawbar and said cemented carbide section,

at least one annular ring for dampening vibrations positioned

in said hollow portion and positioned axially intermediate said head section and said carbide section,

each of said first and said second connection comprising a key and a keyway and a pair of first and second surfaces,

said first surfaces and said second surfaces, respectfully, extending on either side of said respective key and said keyway substantially within a plane perpendicular to said axis of rotation, and

said first surfaces being adapted to meet the said second surfaces to align said head section, said intermediate section, and said cemented carbide section along said longitudinal axis.

4,998,852

ATTACHMENT TOOL FOR MACHINE TOOLS SUCH AS MILLING MACHINES

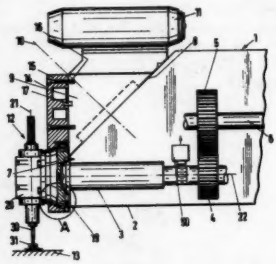
Werner Babel, and Walter Schwarz, both of Pfronten, Fed. Rep. of Germany, assignors to Mabo Aktiengesellschaft, Fed. Rep. of Germany

Filed Dec. 21, 1989, Ser. No. 454,074

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1988, 8815854[U]

Int. Cl.[5] B23C *1/00*

U.S. Cl. 409—144 21 Claims



1. A machining tool attachment to the spindle housing of a milling machine having a program control, the spindle housing having a swivel head with a front surface, and a horizontal work spindle, said attachment comprising:

adapter means mounted to the front surface of the spindle housing;

a machining tool housing having a machining tool and an axis and being coupled to said adapter means, said tool housing being sluable with respect to said adapter, said tool housing axis being oriented at a right angle to the axis of the work spindle; and

means for coupling said machining tool housing to the work spindle for controlled rotation therewith in accordance with the program control of the milling machine.

4,998,853

SELF-DRILLING BLIND RIVET AND METHOD FOR MAKING SAME

Katsumi Shinjo, Osaka, Japan, assignor to Yugenkaisha Shinjo Seisakusho, Osaka, Japan

Filed Jan. 11, 1990, Ser. No. 463,558

Claims priority, application Japan, Jan. 25, 1989, 1-15544

Int. Cl.[5] F16B *13/04*

U.S. Cl. 411—29 1 Claim

1. A self-drilling blind rivet comprising:

a rivet body having a bore extending therethrough;

a mandrel accommodated in said bore, said mandrel including an abutment flange having an outer diameter substantially equal to an outer diameter of said rivet body; and

a drill bit including a substantially post-like drill body having a first end welded to said abutment flange of said mandrel and a second end, opposite the first end, including a drill section, a plurality of longitudinally extending knurled serrations provided about an outer surface of said drill body between said drill section and said first end, said drill body is provided with a tapering body section interposed between an end of said longitudinally extending serrations opposite the drill bit section and said first end of said drill

body, wherein said tapering body section terminates in a flat ring-shaped abutment face extending substantially at a right angle to a longitudinal center axis of the drill section, abutting said abutment flange of said mandrel and having an outer diameter substantially equal to the outer diameter of said rivet body.

4,998,854

Patent Not Issued For This Number

4,998,855

EQUIPMENT FOR STORING AND UNSTORING BULK MATERIAL

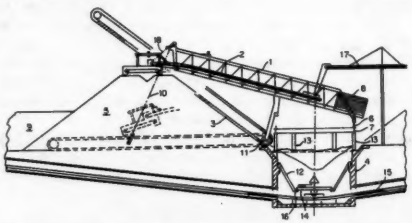
Günter Tschernatsch, Schwabach, Fed. Rep. of Germany, assignor to MAN Gutehoffnungshütte Aktiengesellschaft, Oberhausen, Fed. Rep. of Germany

Filed Aug. 9, 1989, Ser. No. 391,457

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1988, 3827037

Int. Cl.[5] B65G *65/10*

U.S. Cl. 414—133 2 Claims



1. An arrangement for storing and removing from storage bulk material in a round pile, comprising: a substructure; a truss rotatable about a vertical axis on said substructure; a material depositing belt and a bulk material receiving means carried by said truss, said receiving means being pivotable in a vertical direction; a counterweight on said truss for balancing weight, said substructure being hopper-shaped; a bearing, said truss being mounted on said substructure by said bearing; rollers carrying said truss, said truss running on said substructure through said rollers; said bulk material receiving means comprising a drag conveying material to a hopper of said substructure, said hopper having a bottom with a single conveying medium; a conveyor belt running under said conveying medium; said bearing having a large-diameter annular track elevated on posts on said substructure; and said single conveying medium being in the form of a rotatable plough at the bottom of said hopper; said drag comprising two parts, one of said parts being located on one side of said material depositing belt and the other of said parts being located on the other side of

said material depositing belt; said drag having an end facing said substructure and pivoting about a horizontal shaft.

4,998,856

MOTOR VEHICLE PARKING INSTALLATION, FORMING AN AUTOMATIC INDIVIDUAL GARAGE IN AN URBAN ENVIRONMENT

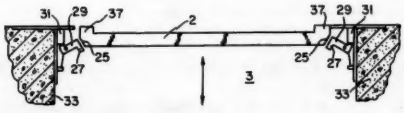
Andre E. LaBarre, 6, rue du Mont-Perdu, 31200 - L'Union, France

Filed Jun. 16, 1989, Ser. No. 367,209

Claims priority, application France, Apr. 18, 1989, 89 05136

Int. Cl.[5] E04H *6/06*

U.S. Cl. 414—240 **3 Claims**



1. In an automobile storage system, an automobile supporting system for supporting an automobile at a vertical entrance to an elevator, said supporting system comprising:

a platform of rectangular shape having a size sufficient to support an automobile and having two upwardly turned longitudinal end sections which are angularly tapered at their bottom corners to form platform supporting surfaces;

four retractable L-shaped floor bolts pivotally mounted at said entrance and arranged in a rectangular pattern peripherally adjacent said end sections, said L-shaped bolts comprising an elongated leg and a transverse base leg having a bearing face, said bolts are movable between a retracted position which allows said platform to pass through said entrance and an extended position which supports said platform with their bearing faces arranged adjacently parallel said platform supporting surfaces to respectively contact the platform supporting surfaces and thereby support the platform;

four adjustable jacks engaged respectively to said four Lshaped floor bolts for pivotally moving said L-shaped floor bolts between said retracted position and said extended position; and

vertical displacement means for vertically translating said platform between different levels in said automobile storage system and for vertically translating the platform through said entrance when said floor bolts are in said retracted position.

4,998,857

STORAGE STRUCTURE FOR TEXTILE BOBBINS

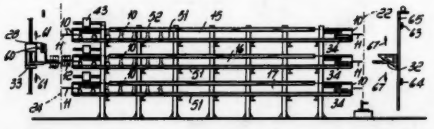
Luciano Paravella, Pavia, and Luigi Figini, Varedo, both of Italy, assignors to Snia Fibre spa, Milan, Italy

Filed Aug. 15, 1989, Ser. No. 393,857

Claims priority, application Italy, Nov. 29, 1985, 23023 A/85; PCT Int'l Appl., Nov. 26, 1986, PCT/EP86/00683

Int. Cl.[5] B65G *1/10*

U.S. Cl. 414—331 **18 Claims**



1. A structure for storing yarn bobbins comprising a plurality of storage units, each of said storage units comprising cantilever projecting support means suitable to engage the central tubular member of said yarn bobbins, characterized in that these said storage units are arranged in a plurality of stationary storage frameworks means to move each storage unit of each stationary storage framework about the stationary storage framework itself along a horizontal annular path, said plurality of stationary storage frameworks being arranged so that at least one stationary storage framework is vertically superimposed over another in a spaced-apart relationship; said superimposed stationary storage frameworks having storage units arranged in a lateral, side-by-side, relationship along each of said storage frameworks each of said stationary storage frameworks defining with its opposite ends a vertical loading surface and a vertical unloading surface; said loading surface and said unloading surface being accessible from horizontally and vertically movable loading means, respectively, said loading means and said unloading means comprising cantilever projecting loading units and unloading units, which are suitable to engage the central tubular member of said yarn bobbins and transfer means suitable to transfer the yarn bobbins from said loading units to said storage units and from said storage units to said unloading units; said transfer means including a moving conveyor belt and plurality of transport units, each of said transport units including at least one cantilever projecting element to support one of said yarn bobbins.

4,998,858

INDUSTRIAL TRUCK FOR PICKING UP A LATERALLY DISPOSED LOAD

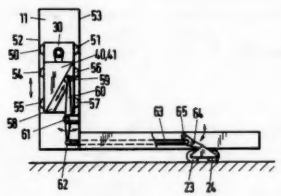
Ernst-Peter Magens, Ammersbek, Fed. Rep. of Germany, assignor to Firma Jungheinrich Unternehmensverwaltung KG, Hamburg, Fed. Rep. of Germany

Filed Dec. 5, 1988, Ser. No. 280,132

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1987, 3740979

Int. Cl.[5] B66F *9/14*

U.S. Cl. 414—495 **11 Claims**



1. An industrial truck having a laterally extending contour and arranged for picking up a laterally disposed load, comprising

a chassis including two transversely extending chassis beams (6, 7) and a longitudinally extending beam (14), which connects the transversely extending chassis beams (6, 7),

wheels (15 to 17), which are disposed under the chassis beams (6, 7) and at least one (17) is driven and steerable,

a laterally extensible and retractable load carrier subassembly (8) comprising a forked load carrier including at least one load carrier arm (21, 22; 109),

guiding means, which are provided on confronting sides of the chassis beams and adapted to guide the load-carrier subassembly on both sides in a lateral direction,

an extending drive for laterally extending and retracting the load carrier subassembly beyond the laterally extending contour of the truck,

stop means for limiting the extending and retracting of said load carrier subassembly,

a lifting drive (37) for vertically moving the load carrier subassembly (8) relative to at least one said chassis beam,

downwardly extensible load-supporting rollers (23, 24; 45, 46) adapted to be supported on the ground under the truck,

which load-supporting rollers (23, 24; 45, 46) for supporting the load carrier arms (21, 22) are mounted on said load

carrier arms (21, 22) and included in the load carrier subassembly,

drive means for downwardly extending the load-supporting rollers (23, 24; 45, 46),

guide tracks (18, 35, 36) on said chassis beams, and guide rollers (33, 34) for guiding said load carrier arms on said tracks and said guide rollers being upwardly displaceable from said guide tracks, said lifting drive (37) comprises a double-acting cylinder-piston device connected at one end to a fork crosspiece housing (11) which is included in said load carrier and carries said load carrier arms and at the other end to beam means extending through said housing and comprising a crossbar (30) and a transverse rod,

said beam means carrying said guide rollers (33, 34) adapted to be supported on and to be lifted from said guide tracks (35, 36),

slotted cam plates (40, 41) are carried by said beam means,

pivoted arms for adjusting an adjusting linkage are guided in cam slots formed in said slotted cam plates and are connected to said drive for extending said load-supporting rollers (23, 24), and

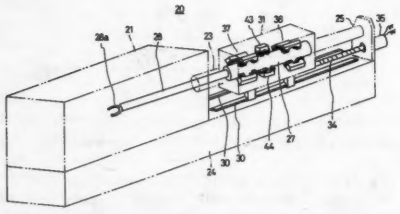
said fork crosspiece housing (11) is vertically movable relative to said beam means.

4,998,859

TRANSFERRING APPARATUS OPERATED IN A VACUUM CHAMBER

Zinichiro Oshima; Kiyoshi Uchiyama, and Ikuo Nanno, all of Narashino, Japan, assignors to Seiko Seiki Kabushik Kaisha, Japan

Filed Sep. 19, 1988, Ser. No. 246,406
Claims priority, application Japan, Oct. 16, 1987, 62-261222
Int. Cl.[5] B66C *23/00*
U.S. Cl. 414—680 **7 Claims**



1. A transferring apparatus operated in a vacuum chamber comprising:

a vacuum chamber communicating with a pipe of nonmagnetic material;

a carrier member formed with a magnetic material and having a manipulator arm which extends into said vacuum chamber, said carrier member being disposed movable in the axial direction within said pipe;

magnetic means for radially floating and axially pulling said carrier member by magnetic force, said magnetic means being disposed facing the periphery of said carrier member through the wall of said pipe;

support means movably disposed along said pipe which passes through said support means, and including therein said magnetic means;

driving means for shifting said support means along said pipe; and

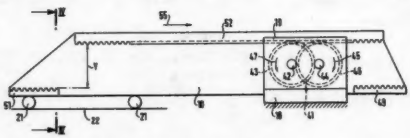
tilt driving means for tilting the manipulator arm upward and downward relative to said pipe in said vacuum chamber.

4,998,860

CONVEYOR APPARATUS

Wilfried E. Dehne, Rockford, Ill., assignor to Fibro, Inc., Rockford, Ill.

Filed Jun. 22, 1988, Ser. No. 209,740
Int. Cl.[5] B65G *65/00*
U.S. Cl. 414—750 **16 Claims**



1. A drive mechanism comprising:

a load mover for connection to a payload for moving the same;

elongate track means extending in a direction in which said load mover is movable;

a drive motor for driving said load mover and a gear system connectable to said drive motor;

wherein said load mover is fixedly connected to one of said gear system and said track means for movement between a start position and a stop position;

wherein said elongate track means comprises first and second tracks extending in series in said direction;

wherein said gear system comprises first rotatable output drive engageable with said first track and connected in operation to said drive motor via an index drive unit forming a first transmission, and a second rotatable output drive engageable with said second track and connected in operation with said drive motor via a second transmission;

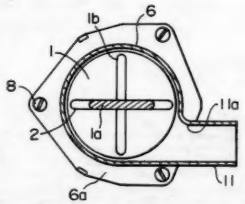
wherein said first track is positioned relative to said second track so that when said first output drive leaves said first track said second output drive is engaged with said second track, wherein said first output drive has, on leaving said first track, a peripheral speed at least substantially equal to the peripheral speed of said second output drive engaged with said second track, and wherein a velocity of said load mover when said first output drive leaves said first track is non-zero and substantially equal to a velocity of said load mover when said second output drive engages said second track.

4,998,861

DRAINAGE PUMP

Sooichi Fukuzawa, and Kazuyuki Yano, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 6, 1989, Ser. No. 446,587
Claims priority, application Japan, Dec. 16, 1988, 63-319212
Int. Cl.[5] F04D *29/42*
U.S. Cl. 415—206 **7 Claims**



1. A drainage pump comprising:

a pump casing having an inlet and an outlet; and

an impeller accommodated in said casing and adapted to be rotated by a driving motor, said impeller having a first plate-like vane, and a second vane mounted coaxially to said first vane, said second vane has an axial length shorter

than an axial length of said first vane, wherein a liquid flows from said inlet toward a front end portion of said first vane along an axis of said first vane, and is discharged to said outlet in a direction substantially perpendicular to the axis of said first vane, and wherein said front end portion of said first vane is formed in a convex shape so as to have an inclined portion which extends from a portion located on the axis of said vane to an outer peripheral edge thereof.

4,998,862

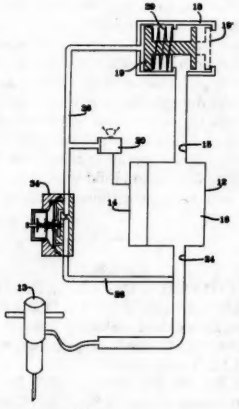
AIR COMPRESSOR PRESSURE REGULATING VALVE SYSTEM

William R. Hutchinson, Clemmons, N.C., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Oct. 2, 1989, Ser. No. 416,278

Int. Cl.[5] F04B *49/08*

U.S. Cl. 417—28 **15 Claims**



1. An apparatus comprising:

a compressor having a compressor inlet and a compressor outlet;

throttle means for regulating the speed of the compressor;

valve means for limiting fluid flow to the compressor inlet;

a pressure regulating valve having an inlet and an outlet, said pressure regulating valve inlet being in communication with the compressor outlet; and

a reservoir communicating the pressure regulating valve outlet and said valve means whereby pressure in the reservoir directly controls operation of the throttle means and the valve means, the pressure regulating valve including a first and a second diaphragm, each diaphragm having a first side and a second side, whereby pressure at the compressor outlet is exerted on the first side of the first diaphragm and the pressure in the reservoir is exerted on both the second side of the first diaphragm and the first side of said second diaphragm.

4,998,863

MAGNETIC PUMP DRIVE

Franz Klaus, Bochum, Fed. Rep. of Germany, assignor to Franz Klaus Union Armaturen Pumpen GmbH & Co., Fed. Rep. of Germany

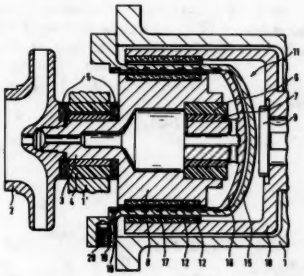
Filed Apr. 11, 1988, Ser. No. 180,002

Claims priority, application Fed. Rep. of Germany, Apr. 11, 1987, 3712459

Int. Cl.[5] F04B *49/10*

U.S. Cl. 417—63 **18 Claims**

1. A magnetic pump drive comprising a driver driven by a motor, a rotor encircled by the driver and connected with an impeller of the pump, the driver and rotor having an identical number m of permanent magnets on opposite cylindrical faces, of which two opposing magnets form a pulling pair, a stationary isolation shell having a cylindrical section and encircling the rotor, the stationary isolation shell being in contact with the medium to be pumped on its inside and sealed against the housing of the pump, and through which shell the force of the



permanent magnets passes for effecting the drive from the driver to the rotor, the isolation shell particularly comprising an outer and an inner shell, the outer shell and the inner shell making contact against each other at least in the cylindrical section and comprising a channel system in the outer shell in the area of contact between the outer and inner shells.

4,998,864

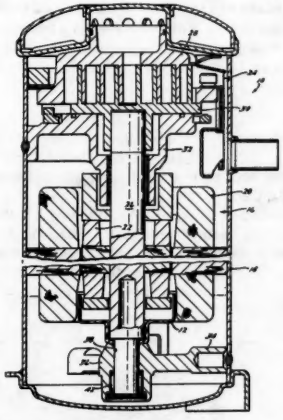
SCROLL MACHINE WITH REVERSE ROTATION PROTECTION

Earl B. Muir, Sidney, Ohio, assignor to Copeland Corporation, Sidney, Ohio

Filed Oct. 10, 1989, Ser. No. 419,463

Int. Cl.[5] F01C *21/00*

U.S. Cl. 417—410 **11 Claims**



1. A refrigeration compressor comprising:

compressor means;

motor means including a rotor and stator;

shaft means coupled to said compressor means and having said rotor secured thereto for operatively driving said compressor means;

a bearing housing for rotatably supporting said shaft means; and

one-way clutch means disposed within said bearing housing and being operative between said shaft means and said bearing housing to prevent rotation of said shaft means in

one direction while allowing rotation thereof in the other direction whereby movement of said compressor means in said one direction may be prevented.

4,998,865

BRUSHLESS DC PUMP WITH ENCLOSED CIRCUIT BOARD

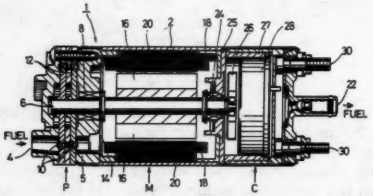
Shingo Nakanishi, Obu, and Susumu Yamamoto, Kawasaki, both of Japan, assignors to Aisan Kogyo Kabushiki Kaisha, Obu and Fuji Electric Co., Ltd., Kawasaki, both of, Japan

Filed Jul. 10, 1989, Ser. No. 377,326

Claims priority, application Japan, Jul. 11, 1988, 63-91987; Dec. 8, 1988, 63-310843[U]

Int. Cl.[5] F04B *39/00, 17/00*

U.S. Cl. 417—423.7 **29 Claims**



1. A motor-driven pump comprising:

a pump housing;

a brushless motor mounted in said pump housing;

pump means mounted in said pump housing and adapted to be driven by said brushless motor; and

a circuit package mounted in a liquid passage defined in said pump housing, said circuit package enclosing a circuit board mounting thereon a control circuit for controlling rotation of said brushless motor and means for detecting a rotor position of said brushless motor, wherein said circuit board is fixed through an elastic member to an inner wall of said circuit package with a gap defined between said circuit board and said inner wall, and said circuit package is opposed to said brushless motor at a position where said circuit board is spaced a distance from said brushless motor in an axial direction of a rotating shaft of said brushless motor.

4,998,866

PRECISION LIQUID HANDLING APPARATUS

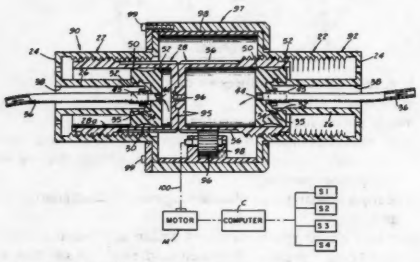
Arthur Harris, San Mateo, Calif., assignor to Davis Meditech, Inc., Davis, Calif.

Continuation-in-part of Ser. No. 85,659, Aug. 17, 1987, Pat. No. 4,873,877. This application Sep. 29, 1989, Ser. No. 414,706

The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.

Int. Cl.[5] F04B *19/02*

U.S. Cl. 417—460 **7 Claims**



1. A liquid handling apparatus comprising:

(a) first and second operably interconnected liquid metering and aspirating devices each comprising:

(i) a threaded hollow base member having a bottom closure wall;

(ii) a rigid stator non-rotatably mounted within said base member;

(iii) a threaded liquid container adapted to be threadably interconnected with said base member upon rotation of said container relative to said base member, said container having an inner wall and a top closure wall;

(iv) conduit means for conducting fluid between the interior of said liquid container and the exterior of the device; and

(v) a non-rotatable plunger reciprocally movable a precise axial distance within said liquid container only upon rotation of said container relative to said base member, said plunger having:

(1) sealing means adapted to sealable engage said inner wall of said liquid container for preventing leakage of fluid between said plunger and said inner wall upon non-rotatable axial movement of said plunger within said liquid container; and

(2) connecting means for operably interconnecting said plunger with said stator for preventing rotation of said plunger relative to said stator; and

(b) drive means for simultaneously rotating said liquid containers of said first and second liquid metering and aspirating devices in a first direction whereby fluid is expelled from said first liquid container of said first liquid metering and aspirating device and fluid is aspirated into said liquid container of said second liquid metering and aspirating device.

4,998,867

ROTARY MACHINE HAVING AXIAL PROJECTIONS ON VANES CLOSER TO OUTER EDGE

Hiroshi Sakamaki; Yukio Horikoshi; Takeshi Jinnouchi, and Kenji Tanzawa, all of Sakado, Japan, assignors to Eagle Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 197,548, May 23, 1988, Pat. No. 4,958,995, which is a continuation-in-part of Ser. No. 75,006, Jul. 17, 1987, abandoned, and a continuation-in-part of Ser. No. 110,919, Oct. 21, 1987, abandoned, and a continuation-in-part of Ser. No. 113,568, Oct. 26, 1987, abandoned, and a continuation-in-part of Ser. No. 115,677, Oct. 30, 1987, abandoned. This application Aug. 16, 1989, Ser. No. 394,779

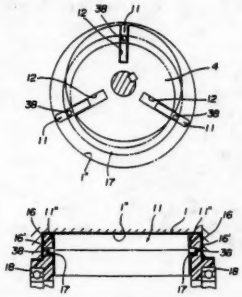
Claims priority, application Japan, Jul. 22, 1986, 61-111490[U]; Jul. 22, 1986, 61-170903; Oct. 23, 1986, 61-161609[U]; Oct. 23, 1986, 61-161610[U]; Nov. 4, 1986, 61-168145; Nov. 4, 1986, 61-168147[U]; Nov. 14, 1986, 61-269960[U]; Nov. 14, 1986, 61-269961; Nov. 17, 1986, 61-271934; Nov. 21, 1986, 61-178287; Nov. 21, 1986, 61-178288[U]; Nov. 21, 1986, 61-276689; Nov. 21, 1986, 61-276690; Dec. 3, 1986, 61-185571

Int. Cl.[5] F01C *1/344*

U.S. Cl. 418—256 **9 Claims**

1. A rotary machine comprising a housing means having a rotor chamber, said rotor chamber having an inner peripheral surface, a rotor means rotatably mounted in said rotor chamber, said rotor means having an axis of rotation, said inner peripheral surface having a central axis which is eccentrically disposed relative to said axis of rotation of said rotor means, said rotor means having a plurality of generally radially disposed vane slots, a plurality of vane means slidably mounted in said vane slots and operable to define variable volume chambers for said fluid as said rotor means rotates and said vane means move generally radially in and out of said vane slots, said vane means having longitudinal ends, projection means projecting from said longitudinal ends, annular ring means rotatably mounted on said housing means for rotation about said central axis, an annular channel in each of said ring means coaxial with said central axis, said channels having a constant generally U-shaped cross-sectional configuration throughout

their annular extent, said projection means on said vane means extending into said annular channels such that during rotation of said rotor means, the resulting centrifugal force urges said vane means radially outwardly of the respective vane slot such that said projection means engages said channels to limit the extent of outward radial movement of said vane means from its respective vane slot to preclude sliding contact between said



vane means and said inner peripheral surface of said housing means, said vane means having an inner radial end and an outer radial end extending between said two longitudinal ends of said vane, said outer radial end being disposed juxtaposed to said inner peripheral surface of said housing means during operation of the rotary machine, said projection means being spaced from said outer radial end while being disposed closer to said outer radial end than to said inner radial end.

4,998,868

VANE PUMP WITH SLIDING MEMBERS ON AXIAL VANE PROJECTIONS

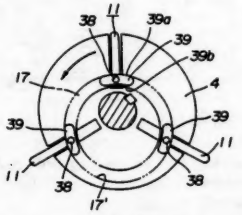
Hiroshi Sakamaki; Yukio Horikoshi; Takeshi Jinnouchi, and Kenji Tanzawa, all of Sakado, Japan, assignors to Eagle Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 197,548, May 23, 1988, Pat. No. 4,958,995, which is a continuation-in-part of Ser. No. 75,006, Jul. 17, 1987, abandoned, Ser. No. 110,919, Oct. 21, 1987, abandoned, Ser. No. 113,568, Oct. 26, 1987, abandoned, and Ser. No. 115,677, Oct. 30, 1987, abandoned. This application Aug. 16, 1989, Ser. No. 394,776

Claims priority, application Japan, Jul. 22, 1986, 61-111490[U]; Jul. 22, 1986, 61-170903; Oct. 23, 1986, 61-161609[U]; Oct. 23, 1986, 61-161610[U]; Nov. 4, 1986, 61-168145[U]; Nov. 4, 1986, 61-168147[U]; Nov. 14, 1986, 61-269960[U]; Nov. 14, 1986, 61-269961; Nov. 17, 1986, 61-271934; Nov. 21, 1986, 61-178287[U]; Nov. 21, 1986, 61-178288[U]; Nov. 21, 1986, 61-276689; Nov. 21, 1986, 61-276690; Dec. 3, 1986, 61-185571[U]

Int. Cl.[5] F01C *1/344*

U.S. Cl. 418—257 **3 Claims**



1. A rotary machine for handling a fluid comprising a housing means having a rotor chamber, said rotor chamber having an inner peripheral surface, a rotor means rotatably mounted in said rotor chamber, said rotor means having a rotor axis, said inner peripheral surface having a central axis which is eccentrically disposed relative to said rotor axis, said rotor means having a plurality of generally radially disposed vane slots, a plurality of vane means slidably mounted in said vane slots and operable to define variable volume chambers for said fluid as said rotor means rotates and said vane means move generally radially in and out of said vane slots, said housing means having housing end walls which define longitudinal ends of said rotor chamber, annular recesses in said housing end walls coaxial with said central axis, annular ring means rotatable in said annular recesses about said central axis, an annular channel in each of said ring means coaxial with said central axis, said vane means having longitudinal vane end walls, projecting vane parts projecting from said vane end walls, a sliding member having a generally oblong cross-sectional configuration rotatably disposed on said projecting vane parts, said annular channel having a radial width greater than the radial thickness of said sliding member, said sliding member being slidably disposed in said annular channel, whereby during rotation of said rotor means, the resulting centrifugal force urges said vane means radially outwardly of the respective vane slot such that said sliding member engages said channel to limit the extent of outward radial movement of said vane means from its respective vane slot to preclude sliding contact between said vane means and said inner peripheral surface of said housing means, said ring means being rotated in approximate synchronism with said rotor means by the frictional contact between said sliding member and said channel in said ring means.

4,998,869

APPARATUS FOR MAKING PARTICLE MATS WITH UNIFORM WEIGHT DISTRIBUTION

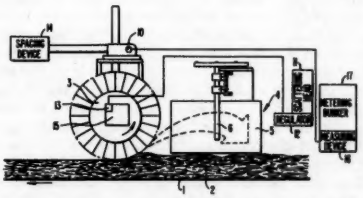
Reinhard Kessing, and Friedrich Schröder, both of Springe, Fed. Rep. of Germany, assignors to Bison-Werke Bähre & Greten GmbH & Co. KG, Springe, Fed. Rep. of Germany

Filed Apr. 6, 1989, Ser. No. 334,663

Claims priority, application Fed. Rep. of Germany, Apr. 7, 1988, 3811677

Int. Cl.[5] B27N *3/02, 3/04*

U.S. Cl. 425—81.1 **12 Claims**



1. An apparatus for evening out the distribution of weight per unit area of a one layer or multi-layer mat for the manufacture of board-like products from generally particulate material, the apparatus comprising:

a mat carrier;

means for moving said mat carrier in a longitudinal direction;

at least one scattering head for scattering particles on said mat carrier to form a mat thereon extending in said longitudinal direction, said mat having a surface remote from said mat carrier and a width transverse to said longitudinal direction;

at least one reverse brushing unit which extends over said width of said mat for brushing particles from said surface backwardly relative to said longitudinal direction along a backward scattering path; and

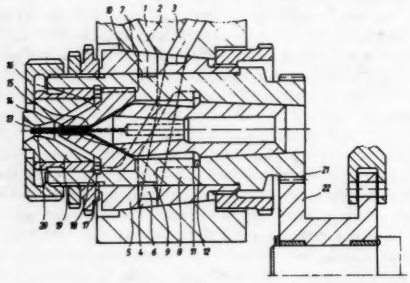
a distributor unit disposed in said backward scattering path before said reverse brushing unit as viewed in said longitudinal direction for subjecting mat particles moving along said backward scattering path to a variable deflection.

4,998,870

MEANS FOR CORE COATING

Gerhard Seibert, Baden, Austria, assignor to Maschinen Gesellschaft m.b.H. Rosendahl, Maria Enzersdorf, Austria

Filed Jul. 26, 1988, Ser. No. 224,305
Claims priority, application Austria, Aug. 12, 1987, 2038/87
Int. Cl.[5] B29C *47/02, 47/06*
U.S. Cl. 425—113 9 Claims



1. Apparatus for the extrusion coating of a core, such as an electrical conductor, with a sheathing having at least two layers or strips of different materials or differently colored materials, said apparatus comprising: a housing having a tubular wall and a longitudinal axis, at least two separate spaced feed conduits extending through the tubular wall into the housing for conveying plasticized materials, said housing having a circumferential groove extending around the periphery thereof, at least two substantially coaxial outflow passageways in the housing communicating with the feed conduits, through which passageways a core to be extrusion-coated passes and which passageways are for conveying the plasticized materials, the said outflow passageways being selectively connected to respective ones of the feed conduits by a distributor means, wherein the distributor means includes a tubular sleeve which is coaxial with and rotatably carried within the housing and which has a plurality of angularly spaced sleeve conduits extending transversely through the sleeve and corresponding in number to the number of housing conduits, the sleeve conduits providing communication between respective ones of the feed conduits and respective ones of the outflow passageways, so that when the sleeve is rotated from a first position to a second position the sleeve conduits provide communication between different ones of the feed conduits and the outflow passageways through a selective communication between said sleeve conduits and said circumferential groove, and drive means operatively connected with the sleeve for rotating the sleeve relative to the housing from a first angular position to a second angular position while flow of plasticized material is maintained to the sleeve conduits, to permit uninterrupted exchange of the plasticized materials between the feed conduits and the outlet passageways without stopping the flow of plasticized materials to the housing.

4,998,871

APPARATUS FOR DEFORMING PLASTIC TUBING FOR LINING PIPE

Patrick R. Ledoux, New Orleans, La., assignor to Pipe Liners, Inc., Metairie, La.

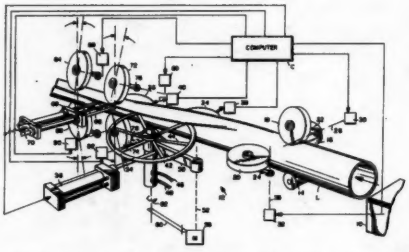
Filed Jan. 19, 1989, Ser. No. 298,754
Int. Cl.[5] B29C *53/08*
U.S. Cl. 425—140 19 Claims

1. Apparatus for producing a deformed pipe lining from a tubular pipe having a longitudinal axis and formed of a plastic material, comprising:

at least one rotatable backup roller disposed on an axis parallel to an axis of, and generally in opposition to, at least one rotatable pipe lining shaping roller said shaping roller having internal heating means;

the backup roller having a periphery generally centered at a plane of bilateral symmetry and adapted to engage a backup portion of the tubular pipe;

said shaping roller having a perimeter disposed generally on said plane of bilateral symmetry so that when said tubular cross-section passes generally between said backup and shaping rollers, a deformable portion of the tubular cross-section is depressed generally diametrically toward said backup portion thereof and substantially along the plane of bilateral symmetry, so that opposite side sections of the



tubular cross-section bend into double wall configurations with a fold thereof juxtaposed to said opposite backup portion of the tubular cross-section, so that the cross-sectional configuration of the tubular portion is altered and reduced; and

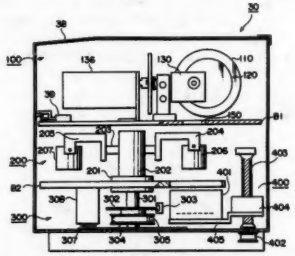
means for deflecting a portion of the tubular pipe opposite the deformable portion of the pipe inwardly toward the axis of the pipe and generally along the plane of symmetry thereof such that the deflected and deformed portions of the pipe have generally similar elongation.

4,998,872

DENTAL CENTRIFUGAL CASTING APPARATUS

Tomoki Funakubo; Yasuharu Hakamatsuka; Mamoru Aihara; Kazuhiro Watanabe, all of Hachioji; Kiyozou Koshiishi, and Sadao Shigetomi, both of Sagamihara, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 12, 1990, Ser. No. 492,812
Claims priority, application Japan, Mar. 17, 1989, 1-65569; Feb. 19, 1990, 2-36316
Int. Cl.[5] B29C *41/04*
U.S. Cl. 425—143 11 Claims



1. A dental centrifugal casting apparatus comprising:

a crucible for receiving a dental casting material;

a crucible holding unit for holding said crucible;

a heating furnace for heating and melting the dental casting material in said crucible;

a crucible forward and backward rotary driving unit for driving said crucible holding unit forward and backward so as to insert said crucible into said heating furnace to heat and melt the material in said crucible and to remove the crucible from said furnace and for rotationally driving

said crucible holding unit so as to inject the melted material into a mold at a predetermined position;

a bucket for holding said mold in which the molten material is injected by the forward and backward motion and the rotation of said crucible performed by said crucible forward and backward rotary driving unit; and

a centrifuge unit for rotating a rotary arm swingably mounting said bucket on an end portion thereof at high speed immediately after the material is injected to apply a centrifugal force to the mold and molten material, thereby performing casting.

4,998,873

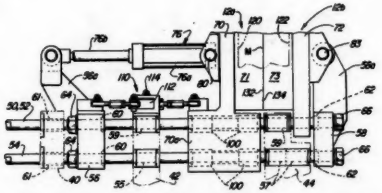
MOLD STATION FOR A BLOW MOLDING MACHINE

M. Warren Martin, Saline, and Lawrence H. Weber, Ypsilanti, both of Mich., assignors to R & B Machine Tool Company, Saline, Mich.

Division of Ser. No. 252,741, Oct. 3, 1988, Pat. No. 4,919,607. This application May 23, 1989, Ser. No. 355,983

Int. Cl.[5] B29C *49/56*

U.S. Cl. 425—541 **8 Claims**



1. A mold station for a blow molding machine, said mold station comprising:

(a) elongated, movable support means for supporting a first mold section and a second mold section, said mold sections movable toward and away from each other along a common axis located between said mold sections,

(b) said first mold section being disposed on the support means such that the first mold section and the support means are relatively movable with respect to one another,

(c) said second mold section being connected to the support means for movement therewith, said second mold section being connected to the support means by a trunnion extending transverse to said axis,

(d) actuating means connected between the first mold section and the support means, said actuating means being operable for moving the support means so that the second mold section moves toward the first mold section, a predetermined distance said actuating means being connected to the first mold section and to the support means by respective trunnions extending transverse to said axis, and

(e) synchronizer linkage means connected between the first mold section and the support means for concurrently moving the first mold section toward the second mold section by a distance equal to said predetermined distance in response to said actuating means, whereby the first mold section and second mold section are clamped together.

4,998,874

MOULD WITH A SINGLE-BLOCK PLUNGER FOR THE MOULDING OF ELECTRIC ACCUMULATOR BOXES

Olimpio Stocchiero, 5 Via Kennedy, 36050 Montorso Vicentino (Vicenza), Italy

Filed Feb. 7, 1989, Ser. No. 307,252

Claims priority, application Italy, Feb. 16, 1988, 85520 A/88

Int. Cl.[5] B29C *45/40*

U.S. Cl. 425—556 **6 Claims**

1. A mould for manufacturing plastic boxes for electric accumulators comprising:

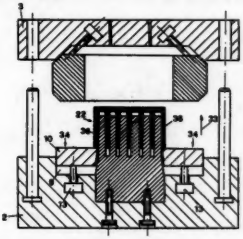
a mobile plate;

a plurality of lateral cores positioned in said mobile plate;

a fixed plate;

gliding columns connecting said mobile plate and fixed plate, said mobile plate being movable along said gliding columns;

a central plunger positioned in said fixed plate, said central plunger being a one-piece unitary element formed from a



single block, the central plunger comprises a single-block box angle-plate and an upper section having a plurality of prismatic cores and wherein the box angle-plate and upper section are joined at a junction having a peripheral slanted surface; and

means for securing said central plunger on said fixed plate and for stripping the boxes from the central plunger after moulding thereof.

4,998,875

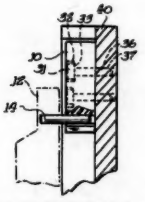
MOLD WITH SLIDE RETAINER

Donald R. Starkey, Norridge, Ill., assignor to D & L Incorporated, Norridge, Ill.

Filed Feb. 28, 1990, Ser. No. 486,518

Int. Cl.[5] B29C *45/26, 45/14*

U.S. Cl. 425—577 **3 Claims**



1. In a mold assembly, the combination comprising:

a slidable mold part,

a fixed mold part,

a pin fixed to the slidable mold part and movable therewith, and

a one-piece retainer of plastic secured to the fixed mold part,

a pair of flexible integral jaws on the one-piece plastic retainer separated by a gap less in width than the width of the pin, said jaws gripping the pin to hold the slidable part at a predetermined position,

said pin flexing the jaws and enlarging the gap to allow the pin to slide through the gap.

4,998,876

COMBUSTION OF LIQUID HYDROCARBONS

David H. Farrar, Scarborough, Canada, assignor to Velino Ventures Inc., Toronto, Canada

Continuation-in-part of Ser. No. 232,390, Aug. 15, 1988, abandoned. This application Aug. 9, 1989, Ser. No. 391,434

Int. Cl.[5] F23J *7/00*

U.S. Cl. 431—3 **12 Claims**

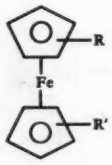
1. A process for burning liquid hydrocarbons in a furnace

while maintaining acceptable levels of NO_x emissions, said liquid hydrocarbons having a Conradson carbon content >1%, said process comprising:

i) burning said liquid hydrocarbon in the presence of an additive composition in an amount sufficient to improve measurably combustion efficiency in burning said liquid hydrocarbon and reduce soot emissions;

said additive comprising;

a) a compound selected from the group consisting of ferrocene and its derivatives represented by the formula:



wherein each of R and R', independent of the other, is hydrogen, alkyl, cycloalkyl, aryl or heterocyclic, and

b) an organic carrier liquid in which said ferrocene is soluble,

ii) said step of burning said liquid hydrocarbon requiring a level of excess air relative to the quantity of said liquid hydrocarbon being burned;

iii) adjusting downwardly said excess air requirement to reduce NO_x emissions in combustion products while maintaining combustion efficiency at an optimal level in the presence of said additive where

1) said level of NO_x emissions in said combustion products, and

2) said level of excess air are less than that occurring for the same level of combustion efficiency in the absence of said additive.

4,998,877

BLOWER BURNER

Jürgen Schilling, Wermelskirchen; Horst Reichmann, Wuppertal; Wolfgang Henche, Remscheid; Thomas Pieper, Wermelskirchen; Bernd Braun, Remscheid, and Hans Ludowisy, Solingen, all of Fed. Rep. of Germany, assignors to Joh. Vaillant GmbH und Co., Remscheid, Fed. Rep. of Germany

Continuation of Ser. No. 626,312, Jun. 29, 1984, abandoned.

This application Jun. 24, 1986, Ser. No. 877,733

Claims priority, application Fed. Rep. of Germany, Oct. 29, 1982, 8230410[U]; Dec. 16, 1982, 8235312[U]; Feb. 26, 1983, 8305799[U]; Mar. 4, 1983, 8306221[U]; Mar. 19, 1983, 8308544[U]; Jun. 22, 1983, 8318419[U]; Jul. 6, 1983, 8319776[U]

Int. Cl.[5] F23N *1/00*; F23D *11/36*

U.S. Cl. 431—19 **39 Claims**

1. A blower burner for a heat source comprising

a blower casing having a rear opening, and a substantially planar front wall;

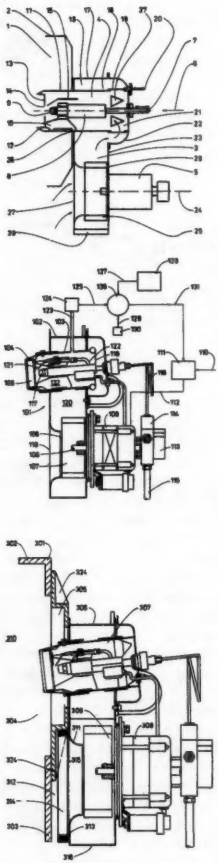
a blower including a fan wheel having a central axis and mounted in the blower casing;

a drive motor attached to the fan wheel at a rear side of the fan wheel with the motor protruding rearwardly on a rear wall attached to the blower casing;

a fire tube disposed in said blower casing adjacent the outer circumference of the fan wheel such as to permit direction of the output air of the fan wheel into the fire tube wherein one end of the fire tube protrudes through said front wall, and where the fire tube is disposed at a small angle versus a line perpendicular to said front wall; a nozzle disposed approximately centrally in the fire tube;

a fuel feed means disposed approximately coaxially in the fire tube for supplying fuel to the nozzle in the fire tube; and

a means covering the rear opening of the blower casing, said



covering means including an inside sleeve supported by said fire tube.

11. A blower burner for a heat source comprising

a blower casing;

a blower including a fan wheel having an axis and mounted in the blower casing;

a drive motor attached to the fan wheel at a rear side of the fan wheel with the motor protruding rearwardly on a rear wall of the blower casing;

a sleeve subdivided in axial direction and provided with a spring means for biasing the subdivided sleeve portions relative to each other;

a fire tube mounted in said blower casing associated with the sleeve and the sleeve forming an extension of the fire tube and provided with an outside surface and provided with openings, which can be covered more or less with the sleeve, and which openings are connected to an output of the blower fan wheel; and

a nozzle disposed in the fire tube,

an internal fuel feed connected to the fire tube for supplying fuel to a nozzle in the fire tube.

19. An oil blower burner comprising

a blower casing having a planar and a rear opening;

a blower including a fan wheel mounted in the blower casing;

a drive motor attached to the fan wheel at a rear side of the fan wheel with the motor protruding rearwardly on a rear wall of the blower casing;

a fire tube disposed adjacent to the fan wheel such as to permit direction of the output air of the fan wheel into the fire tube, said fire tube having a rear end;

a cover attached at the blower casing and bulging rearwardly from the casing where the rear end of the fire tube protrudes beyond the rear wall of the casing of the blower burner in the area of the fan wheel in a direction parallel to the drive motor such that the rear end of the fire tube abuts the rear cover attached at the blower casing and wherein the rear end of the fire tube is furnished with an air entry opening;

a movable sleeve for sliding over the air entry opening, wherein the air entry opening and the movable sleeve serve to provide a pre-control of the burner air feed throughput and wherein the air entry opening can be adjustably covered with said sleeve and where the sleeve can be interposed into the air feed path from the blower to the air entry opening, and wherein the combustion air is in part over some section of its path between the blower and the air entry opening of the fire tube transported in a direction having a substantial component directed opposite relative to the flow direction within the flame tube.

4,998,878

FUEL CONTROL SYSTEM FOR A BURNER

Thomas J. Gruber, Mayfield Heights, Ohio, assignor to Hunter Manufacturing Company, Solon, Ohio

Filed May 10, 1988, Ser. No. 192,465

Int. Cl.[5] F23N *1/00*; F16F *5/00*

U.S. Cl. 431—90 **20 Claims**

1. A burner assembly comprising:

a burner housing having a combustion chamber defined therein;

a fuel injection nozzle secured to said burner housing and communicating with said combustion chamber; and,

a fuel control means for controlling the amount of fuel flowing through said nozzle, said fuel control means comprising:

a valve chamber including a ore and a valve seat,

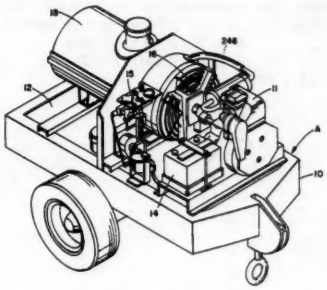
a needle valve adapted to reciprocate in said valve chamber, and

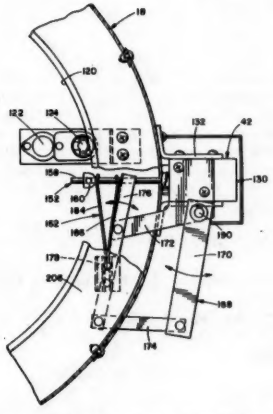
an adjusting means for adjusting a range of motion of said needle valve in said valve chamber, said adjusting means comprising:

a control rod secured at one end to said needle valve,

a bimetallic assembly regulating a motion of said control rood, said bimetallic assembly including a pair of legs which are operably connected to said control rod and are exposed to the heat produced by the burner assembly,

a stop means operatively connected with both said bimetallic assembly and said control rod for limiting a movement of said pair of legs away from each other, and





a linkage means for biasing one leg of said bimetallic assembly, wherein said stop means includes a portion of said linkage means.

4,998,879

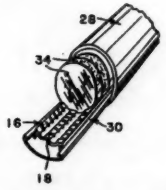
HIGH PURITY DIFFUSION FURNACE COMPONENTS

Bryan D. Foster, Holden, Mass., and Frank Fonzi, Bay City, Mich., assignors to Norton Company, Worcester, Mass.

Continuation-in-part of Ser. No. 188,238, Apr. 29, 1988, abandoned. This application Apr. 18, 1989, Ser. No. 339,570

Int. Cl.[5] F27D *5/00*

U.S. Cl. 432—253 **14 Claims**



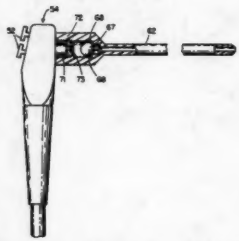
1. A Component for a diffusion furnace, said component being a composite of an impermeable matrix selected from the group consisting of silicon carbide and silicon nitride, and a fabric reinforcement within and coated by said matrix, the reinforcement being silicon carbide, carbon, carbon coated silicon carbide, or combinations thereof, wherein said component is a process tube.

4,998,880

DENTAL SYRINGE SAFETY SHEATH APPARATUS

Robert Nerli, 15 ElQuanito Way, Burlingame, Calif. 94010

Continuation-in-part of Ser. No. 118,170, Nov. 9, 1987, Pat. No. 4,859,182. This application Jun. 30, 1989, Ser. No. 373,507
The portion of the term of this patent subsequent to Aug. 22, 2006, has been disclaimed.
Int. Cl.[5] A61C *17/02*
U.S. Cl. 433—80 14 Claims



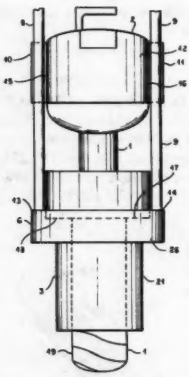
1. An apparatus comprising a disposable beak for a dental syringe, said beak having a syringe body engaging-end and a terminal-end, said syringe body engaging end having means to engage said syringe thereon in a fluid tight engagement and having a back flow preventing valve therein, said terminal-end having an aperture to allow a fluid to be dispensed therefrom.

4,998,881

DEVICE AND METHOD FOR PRODUCING IMPLANT CAVITIES

Nikola Lauks, Saalkamp 8, 2000 Hamburg 65, Fed. Rep. of Germany

Filed Jan. 30, 1989, Ser. No. 304,365
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1988, 3802789
Int. Cl.[5] A61C *8/00*
U.S. Cl. 433—173 24 Claims



1. A jaw-surgery instrument for boring implant cavities, comprising:

a drill provided with a boring tool;

a guide sleeve receiving said tool and slidably guiding said tool along an axis of said guide sleeve;

a guide-sleeve template conforming in shape to a shape of a jaw region of a patient to receive an implant and holding said guide sleeve for positioning said guide sleeve in said jaw region of the patient, said guide sleeve being formed with an end turned toward said drill and an end turned away from said drill and received in said template, said end turned toward said drill being formed with a radially outwardly extending annular flange; and

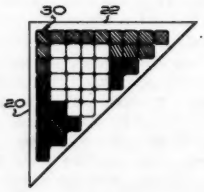
a slide extending upwardly from said annular flange and guiding said drill relative to said guide sleeve.

4,998,882

COLOR INDICATING DEVICES

Richard D. Glover, Ossett, England, assignor to R.G.S. Pattern Book Co. Limited, Ossett, England

Continuation of Ser. No. 333,492, Apr. 4, 1989, abandoned. This application Jul. 27, 1990, Ser. No. 560,012
Claims priority, application United Kingdom, Apr. 26, 1988, 8809825
Int. Cl.[5] G09B *29/00*
U.S. Cl. 434—98 10 Claims



1. A kit comprising a colour indicating device for use in the selection of a base colour and graded shades, tints and tones thereof, for textile materials comprising:

(a) a holder which is in the shape of an isosceles triangle and defining a base and two sides of equal length;

(b) a plurality of yarn poms evenly arranged and filling said triangular holder and comprising a base colour pom at the apex of the triangle between said two sides of equal length, tint poms of progressively increasing tint of the base colour arranged along one of said sides of equal length in a direction from the end of said side adjacent the base pom to the other end of said side, shade poms of progressively increasing shade of the base colour arranged along the other of said sides of equal length in a direction from the end of said side adjacent the base pom to the other end of said side, and tone poms filling the remainder of the triangular holder and being of progressive gradings of shade and tint related to the distance of each of the shade poms from said sides of equal length said kit including a plurality of said triangular holders, each having poms displaying a different base colour, its shades, its tints and its tones, such holders being arranged and grouped to form squares, such that the base colour poms of the holder in each square have a related colour, the squares being held in a square case.

4,998,883

EDUCATIONAL TOY

Christie Brinkley, Further La., East Hampton, N.Y. 11937

Filed Mar. 9, 1989, Ser. No. 321,194
Int. Cl.[5] G09B *1/00*
U.S. Cl. 434—159 2 Claims

1. An educational toy for teaching letter construction and recognition, which comprises

(a) a plurality of elemental components having shapes and sizes to constitute component parts of letters of the alphabet,

(b) each part having a size or shape different from another part being formed of a distinctly different color,

(c) all parts of identical size and shape being of the same color,

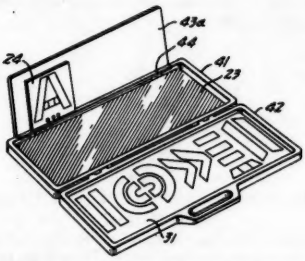
(d) means presenting a graphical illustration of each letter formable by one or more of said elemental components of a predetermined number and shape,

(e) said graphical illustrations each including an illustration

of the elemental components in their respective colors, whereby the elemental components necessary for the construction of a letter may be selected on the basis of color recognition as well as shape recognition,

(f) each of said graphical illustrations including a dot code,

(g) said dot code being separate from the illustration of the letter and comprising a plurality of individual code elements of a shape unrelated to the shapes of the elemental



components but equal in number to the number of elemental components required to form the illustrated letter,

(h) the individual elements of said dot codes being of colors corresponding to the respective colors of the elemental components for the illustrated letter, whereby the predetermined number and shape of elemental components for an illustrated letter may be selected exclusively by reference to said dot code.

4,998,884

CONNECTOR APPARATUS FOR HIGH DENSITY COAXIAL CABLES

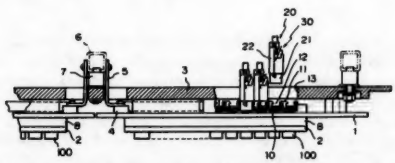
Kouji Ishikawa; Kyoichiro Kawano; Teruo Murase, all of Yokohama, Japan; Jerzy R. Sochor, Santa Cruz, and C. Timothy Norman, San Jose, both of Calif., assignors to Fujitsu Limited, Kawasaki, Japan and Amdahl Corporation, Sunnyvale, Calif.

Filed Jan. 26, 1989, Ser. No. 301,707

Claims priority, application Japan, Jan. 26, 1988, 63-008695; Jan. 26, 1988, 63-008696; Jan. 26, 1988, 63-008697

Int. Cl.[5] H01R *13/652*

U.S. Cl. 439—49 **12 Claims**



1. An apparatus for connecting a high density cable assembly to be connected to corresponding contact pins provided no a substrate having guides, each guide having a predetermined number on contact pins therein, the apparatus comprising: a connector to which the cable assembly is connected and which is to be mounted on the associated guide, said connector having a connector body guided by the associated guides and a connector cover surrounding the connector body, and latching means, rotatably mounted between the connector body and the connector cover, for latching the connector to the associated guides, and wherein electrical shielding of the cable assembly is effected by the guides and connector cover.

4,998,885

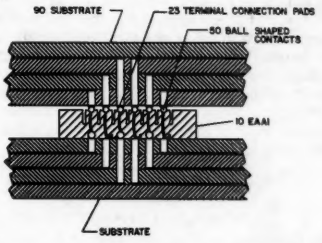
ELASTOMERIC AREA ARRAY INTERPOSER

Brian S. Beaman, Hyde Park, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 27, 1989, Ser. No. 427,548

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—66 **8 Claims**



1. An elastomeric electrical connector comprising:

a plurality of metal wires extending through elastomeric material, said elastomeric material having first and second opposing surfaces, each of said plurality of metal wires being attached to a substrate terminal contact on a first end and, having a ball shaped contact on a second end, said plurality of metal wires being supported by said elastomeric material on a first substrate;

said first end being attached to said substrate terminal contact by a metal bond, said metal bond connecting said first substrate to said elastomeric electrical connector and being substantially embedded in said first surface of said elastomeric material; said ball shaped contact extending from said second surface of said elastomeric material and connecting a second substrate having terminal contacts to said elastomeric electrical connector when said first substrate and a second substrate compress said elastomeric material between said first and second substrates; and

a plurality of scribes extending substantially into said second surface of said elastomeric material, said scribes being interposed between and separated from said plurality of metal wires to enable each of said plurality of metal wires to substantially compress independently from adjacent metal wires.

4,998,886

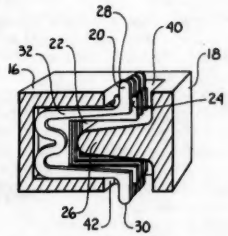
HIGH DENSITY STACKING CONNECTOR

Oskar O. Werner, Leucadia, Calif., assignor to Teledyne Kinetics, Solana Beach, Calif.

Filed Jul. 7, 1989, Ser. No. 376,522

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—66 **20 Claims**



1. An electrical connector for interconnecting printed boards which have a plurality of electrical pads each distanced from another by at least twenty-five thousandths (0.025) of an inch, which comprises:

a base formed with a cavity;

a plurality of electrically conductive contacts, each having a spring-like body portion interconnecting a respective first end point and a respective second end point, said body portion having two cantilevers joined by a bent support portion, said end points being respectively formed on said cantilevers to enable said end points to move relative to each other, each of said body portions establishing a single path for electrical conductivity between respective said end points, said contacts positionable in said cavity with said first end points aligned together and said second end points aligned together in a substantially parallel relationship to said first end points, each of said contacts having a thickness less than ten thousandths (0.010) of an inch; and

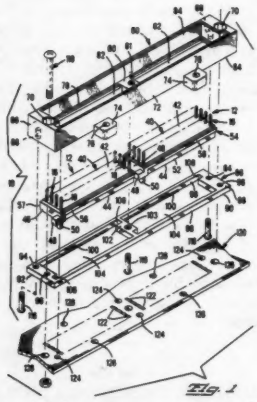
a plurality of insulators each separately interposed between each of said contacts to electrically isolate each of said contacts, each of said insulators having a thickness less than ten thousandths (0.010) of an inch.

4,998,887

PIN HEADER CONNECTOR

John W. Kaufman, Hershey, and Donald J. Summers, Shiremanstown, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 25, 1990, Ser. No. 543,235
Int. Cl.[5] H01R *9/09*
U.S. Cl. 439—78 **8 Claims**



1. An improved pin header connector mountable to a circuit substrate comprising:

a plurality of terminal subassemblies, each subassembly comprising an array of terminal members secured in dielectric means, each said dielectric means having mating and mounting surfaces, each said terminal member having a forward connecting portion at least exposed at said mating surface and a rearward connecting portion at least exposed at said mounting surface, said second connecting portions of said array of terminal members being adapted to electrically engage respective conductive areas of a corresponding array on the circuit substrate;

shell means defining a like plurality of terminal subassembly receiving cavities and including means securing said terminal subassemblies within respective said cavities in a manner permitting incremental floating of said subassemblies in a transverse direction relative to said shell means, defining a connector;

means included on each said terminal subassembly for aligning thereof cooperable with corresponding aligning means of the circuit substrate associated with each said array of conductive areas by causing incremental transverse movement of each said terminal subassembly within a respective said cavity, such that said second connecting portions of each said array of terminal members are aligned with respective conductive portions of a respective corresponding array on said substrate upon connector mounting thereon; and

means independent of said aligning means for mounting said shell means to said substrate such that said terminal members are electrically engaged with corresponding conductive pad arrays on said substrate, whereby

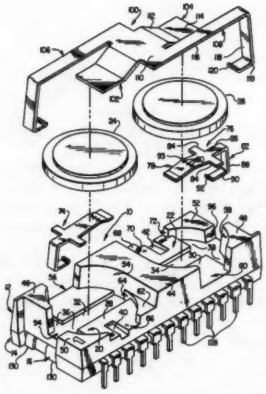
the connector so defined includes terminal subassemblies each independently alignable with corresponding arrays of conductive areas on said substrate while being retained in a common shell.

4,998,888

INTEGRATED CIRCUIT PACKAGE WITH BATTERY HOUSING

Joseph Link, Carrollton; Michael L. Bolan, Dallas; Allen H. Brunk, Jr., Carrollton, and Paul E. Schneikart, Lewisville, all of Tex., assignors to SGS-Thomson Microelectronics, Inc., Carrollton, Tex.

Continuation of Ser. No. 633,374, Jul. 23, 1984, abandoned, which is a continuation of Ser. No. 282,183, May 27, 1981, abandoned. This application Mar. 28, 1986, Ser. No. 846,510
Int. Cl.[5] H01R *13/00*
U.S. Cl. 439—73 **20 Claims**



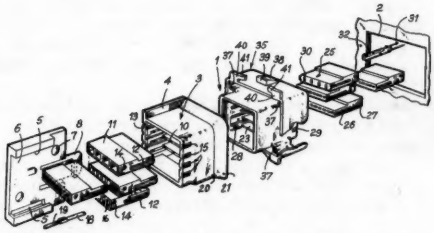
1. Apparatus comprising an integrated circuit formed on an integrated circuit chip, a leadframe electrically connected to said integrated circuit, said leadframe having a plurality of connector pins, a housing of insulating material molded about and encapsulating said integrated circuit and a portion of said leadframe so that said connector pins extend externally of said housing for connection to an external source of electrical power, battery support means for receiving and supporting at least one battery within said housing, said battery support means being formed integrally with said housing and comprising at least one recess formed in said housing, each said recess adapted to receive a battery, and clip means connected to said housing extending in a spaced relationship to each said recess for securing said battery in each said recess, the battery being carried within said battery support means for supplying electric power to said integrated circuit, and electrical conductor means electrically connecting said battery to at least two of said connector pins for supplying electrical power to said integrated circuit.

4,998,889

ELECTRICAL CONNECTOR

José Moly, Gratentour, France, assignor to Labinal S.A., Montigny Le Bretonneux, France

Filed Oct. 26, 1989, Ser. No. 426,684
Claims priority, application France, Oct. 26, 1988, 8813984
Int. Cl.[5] H01R *13/629*
U.S. Cl. 439—247 **26 Claims**



1. Molded plastics material housing for an electrical connector comprising:

a female housing member incorporating a skirt;

a male housing member adapted to be inserted into said skirt;

guide means on one of said male and female housing members for aligning said male and female housing members during insertion of said male housing member into said skirt;

multiple channels in each of said male and female housing members of which those in one housing member are adapted to receive male electrical connection members and those in the other housing member are adapted to receive corresponding female electrical connection members;

a support for at least one of said male and female housing members;

corrugated elastic strips joining said at least one housing member to said support so that it can oscillate therein; and

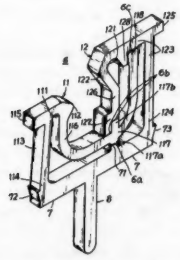
said at least one housing member, said support and said elastic strips being molded in one piece from said plastics material.

4,998,890

STRESS-COMPENSATED CONTACT ELEMENT OF ELECTRICAL CONNECTOR

Kenny Tuan, 5F, No. 30, Lane 423, Yuan-San Road, Chung Ho City, Taipei Hsien, Taiwan

Filed Jul. 5, 1990, Ser. No. 548,589
Int. Cl.[5] H01R *23/70*
U.S. Cl. 439—326 **9 Claims**



1. A contact element of an electrical connector including a connector base having an elongate socket longitudinally formed in the connector base, a plurality of slots transversely formed in said elongate socket for receiving a plurality of contact elements therein, a daughter printed circuit board inserted through the socket to be clamped by the plurality of contact elements for connecting the daughter board to a mother board secured to the connector base, each contact element having a leg portion protruding downwardly to be connected with the mother board, the improvement which comprises:

said contact element including:

a first spring contact portion having a first inner clamping arm member arcuately extended and a first outer supporting arm member connected with the first inner clamping arm member resiliently integrally secured to a base portion embedded in a bottom portion in the connector base;

a second spring contact portion oppositely spaced apart from said first spring contact portion for clamping the daughter board in commensuration with said first spring contact portion having a second outer supporting arm member resiliently integrally secured to the other portion of said base portion opposite to said first outer supporting arm member; and

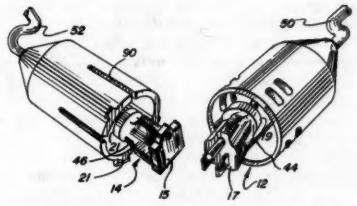
at least a stress-adjusting means formed in said contact element for adjustably releasing or counterbalancing any internal stress caused when inserting the daughter board in the socket of connector base to be resiliently clamped by said first and second spring contact portion.

4,998,891

HOLDER FOR MAINTAINING ELECTRICAL CONNECTIONS

Joseph R. Bresko, 5315 Cleveland St., Hollywood, Fla. 33021

Filed Nov. 4, 1988, Ser. No. 267,355
Int. Cl.[5] H01R *13/627*
U.S. Cl. 439—369 **5 Claims**



1. For use with the combination of (a) a male electrical plug **(12)** with a first lead conductor **(50)** and (b) a female electrical plug **(14)** with a second lead conductor **(52)**, wherein the plugs **(12)**, **(14)** each have an axial, proximal face **(19)**, **(21)** and a distal face **(15)**, **(17)** and when the plugs are in electrical engagement the distance between the proximal faces is of a predetermined distance,

a shell-like structure **(22)** to maintain the plugs in electrical engagement with one another comprising,

(a) a first and a second cup-shaped mating shell portion **(24, 26)**,

said first shell portion **(24)** having a rim **(28)** defining an open first mouth of a first diameter, said first shell portion being of a depth to receive one of the plugs **(12)**,

said first shell portion **(24)** including a base **(36)** with a through hole **(40)** and a tubular portion **(32)** extending from the base to the rim **(28)**,

said first shell portion further including an elongate slit **(44)** extending from the, hole **(40)** axially to the open mouth for insertion of the lead conductor **(50)** on said one of the plugs **(22)**,

said tubular portion **(32)**, adjacent the rim **(28)**, having a plurality of equiangularly spaced, generally elliptically shaped openings at a common distance from the rim,

said second shell portion **(26)** having a second rim edge **(30)** defining a second mouth of a second diameter smaller than the first diameter of the first shell portion,

said second shell portion being sized for receipt of the rim edge **(30)** through the first mouth and into the first shell

portion in telescoping relation and being of a depth to receive the other of said plugs,

said second shell portion including a base (38) having a through hole (42) and a tubular portion (34) extending from the base (38) to the rim edge (30),

said second shell portion including a slit (46) extending from the hole (42) in the base (38) to the mouth for insertion of the lead conductor (52) on the other of said plugs,

said second shell portion further including a plurality of raised portions (64) exteriorly on the tubular portion (34) at the rim edge (30), each of said raised portions being equiangulary spaced from one another for registry with one of the openings in the first shell portion so that upon telescopic movement of the shell portions towards one another said raised portions are received and captivated in the openings,

each of said raised portions including,

an outer surface sized to nest in one of the elliptical openings,

a distal surface (68) inclined from the rim edge (30) to the outer surface,

a proximal surface extending generally radially from the tubular portion (34),

and circumferentially facing surfaces (70) converging toward one another from the tubular portion (34) to the outer surface,

whereby each of said raised portions, upon assembly of the shell portions, are sized to dwell in one of the elliptical openings with the proximal surfaces of the raised portions bearing against the elliptical openings in response to axial forces on the lead conductors so that the shell portions assume the axial load on the electrical plugs,

said second shell portion having a plurality of axially extending slots (90) extending from the rim edge (30) toward the base (38), so that, when the tubular portion of the second shell portion is grasped tightly adjacent the rim edge (30), the diameter of the mouth of the second shell portion is reduced somewhat for ease of insertion into the open mouth of the first shell portion,

said first and second shell portions being rotatable when in telescoped relation so that on relative movement of rotation, the inclined surfaces (70) of the raised portions ride out of the elliptical openings and the shell portions may be separated from one another by moving the same axially apart, and

said shell-like structure being of relatively rigid plastic material which is bendable and yieldable within the range of its plastic memory so that, upon said axial forces being relaxed thereon, its original shape is maintained.

4,998,892

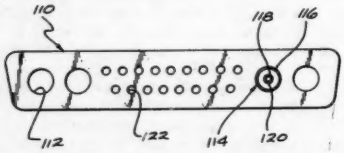
GUIDE PIN APPARATUS FOR MODULE CONNECTOR

Robert J. Shiley, Riverside, Calif., assignor to ITT Corporation, New York, N.Y.

Filed Mar. 12, 1990, Ser. No. 491,777

Int. Cl.[5] H01R *13/629*

U.S. Cl. 439—381 3 Claims



1. In a module connection system wherein a plug connector at the rear of a module mates with a receptacle connector mounted on a frame, wherein the plug connector includes a body of insulative material having a plurality of small signal contact-receiving holes holding signal contacts and a plurality of larger contact-receiving holes, and wherein the plug connector also includes a shell extending around and rearward of said body, and the receptacle connector includes an insulative body having corresponding small holes holding signal contacts and a plurality of corresponding larger holes, the improvement including:

a pair of guide pins, each having a forward portion retained in one of said larger holes of said plug connector insulative body, and each having a rear portion projecting rearwardly from said insulative body further than said shell;

a pair of larger socket contacts each mounted in one of said larger holes of said receptacle connector insulative body and constructed to closely receive said rearward portions of said pair of guide pins;

each of said guide pins has a narrower rearward guide part and a greater diameter more forward contacting part;

each of said larger socket contacts has a plurality of resilient fingers that tightly engage said greater diameter contacting part of a fully inserted guide pin, and a more rearward hole that receives said narrower guide part of the guide pin.

4,998,893

PLASTIC CASING PROVIDED WITH CODING ELEMENTS FOR MACHINE PROCESSING

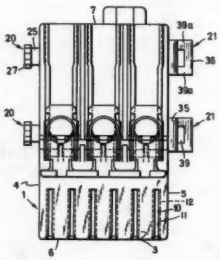
Konrad Mantlik, Wuppertal, Fed. Rep. of Germany, assignor to Grote & Hartmann GmbH & Co. KG, Wuppertal, Fed. Rep. of Germany

Filed Nov. 2, 1989, Ser. No. 430,767

Claims priority, application Fed. Rep. of Germany, Nov. 9, 1988, 8814032[U]

Int. Cl.[5] H01R *13/64*

U.S. Cl. 439—488 15 Claims



1. A plastic casing for receiving electric contact elements to be installed by machine in a corresponding apparatus, said casing comprising:

coding means readable by the machine for determining number and arrangement of the electric contact elements in said casing to insure matching of said casing with the corresponding apparatus;

said coding means including grooves provided in said casing and pins removably insertable in said grooves to provide a predetermined code determined by presence and non-presence of said pins in said grooves, so that presence of a first pin in a first groove provides one code information and non-presence of a second pin in a second groove provides another different code information;

said grooves having a preselected spacing from each other and from walls of said casing; and

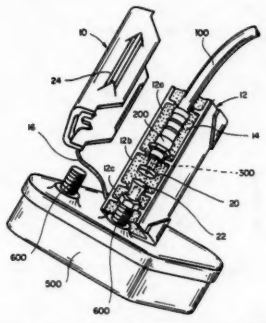
said grooves being provided with wall means to removably secure said pins in said grooves so that said pins can only slide into and out of said grooves.

4,998,894

COAXIAL CABLE CONNECTOR SEAL

Daniel Gronvall, Pleasanton, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Filed Oct. 6, 1988, Ser. No. 254,336
Int. Cl.[5] H01R *13/52*
U.S. Cl. 439—521 16 Claims



1. A cable connector housing for surrounding and sealing the male and female portions of respective coaxial cable connectors or a coaxial connector to a radio frequency source, said housing comprising:

a base member and a top member capable of fitting together to form a surrounding housing for the male and female portions of a connector or a connector and a radio frequency source; and

compartment means defined by separation members within said base member for accepting the male and female portions both in the male to female connected position and in the nonconnected position where the male and female portions are disconnected but still sealed within the housing and are located in different compartments; and

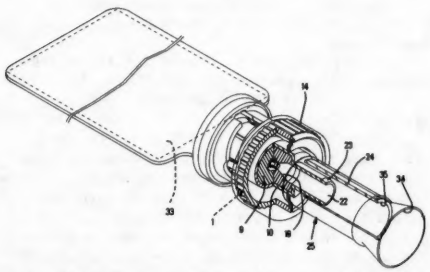
environmental sealing means contained within each of the compartments.

4,998,895

PACKAGED ELECTRICAL CONNECTOR

Edgar W. Forney, Harrisburg; Andrew J. Gabany, Mechanicsburg, and Tracy L. Smith, Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Nov. 14, 1989, Ser. No. 436,564
Int. Cl.[5] H01R *9/05*
U.S. Cl. 439—585 14 Claims



1. A packaged connector comprising, a preassembled connector 1 in a transparent package, wherein the improvement comprises;

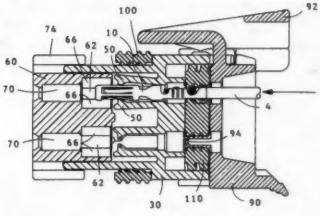
the connector includes an electrical contact having a friction socket facing an open end of the package, and a loose crimp ferrule is precisely positioned by the package concentrically with a barrel of the connector for one step crimping of the ferrule radially toward the barrel, a concentric space is defined between the ferrule and the barrel, and open ends of the ferrule and the barrel face the open end of the package.

4,998,896

SEALED STAMPED AND FORMED PIN

Robert G. Lundergan, Kernersville, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 25, 1989, Ser. No. 411,961
Int. Cl.[5] H01R *13/40*
U.S. Cl. 439—595 16 Claims



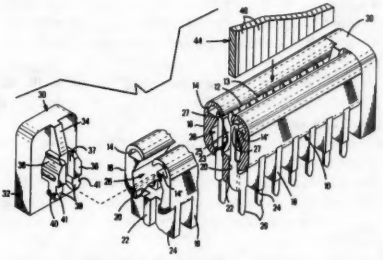
1. A pin for use as an electrical terminal, the pin being stamped and formed from a metal blank into a tubular shape said blank being provided with a depression on an interior surface of a predetermined width; a plug being partially sheared from and remaining joined to the blank by an integral tail, the contour of the plug having substantially the same shape as the inner surface of the tubular pin, the tail being bent with the plug being formed up so that the blank is formed and crimped around the plug with an edge thereof being received in said depression and with the interior of the pin being closed off by the plug.

4,998,897

ELECTRICAL CONNECTOR END CAP

Howard W. Rose, Boiling Springs, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 26, 1990, Ser. No. 558,022
Int. Cl.[5] H01R *13/00*
U.S. Cl. 439—629 5 Claims



1. An electrical connector including:

a dielectric housing having a longitudinal cavity extending therethrough from end to end, a slot in the top of said housing extending into said longitudinal cavity to receive a circuit board inserted therein, the ends of said cavity being open, a plurality of vertical apertures extending along the bottom of said housing opening into said longitudinal cavity to receive and retain terminal members oriented to engage said circuit board, and further extend-

ing through the bottom of said housing to accommodate portions of said terminal members extending through said housing to be fitted within corresponding apertures and of a further circuit board and soldered thereto;

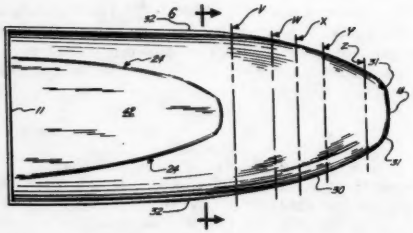
end caps including end walls configured to cover end profiles of said housing and said open ends of said longitudinal cavity said end caps including projections extending transversely to said end wall and of a configuration to fit in easy sliding engagement within said longitudinal cavity of said housing, said caps further including latch means extending from said projections, said latch means adapted to engage the vertical walls of corresponding ones of said vertical apertures and be biased inwardly to facilitate the downward displacement of said end caps with a said latch means engaging lower wall surfaces of said housing to lock said end caps to said housing as said caps are inserted horizontally and pushed downwardly therewithin.

4,998,898

ULTRALIGHT/COMPACT AIRBOAT APPARATUS

Randy Dufrene, P.O. Box 991, Luling, La. 70070

Filed Mar. 31, 1989, Ser. No. 332,958
Int. Cl.[5] B63H *7/00*
U.S. Cl. 440—37 **7 Claims**



1. An ultralight compact airboat apparatus comprising:

(a) a hull having a wide transom defining substantially the beam of the hull and the approximate rear one-half of the hull being of generally uniform beam width, the hull having a blunt nose portion defining the narrowest portion of the hull and outwardly included sidewalls that are flat at the rear half;

(b) the hull bottom having a generally flat parabolic-shaped portion that is wide at the stern and narrower toward the middle of the hull;

(c) at least the rear half of the hull having transition portion with a continuous curvature of a small radius of curvature that defines an interface between the hull bottom and sidewall, and the sidewall having a curvature that gradually increases toward the blunt nose int he forward half of the hull;

(d) a motor support rigidly mounted inboard of the hull transom and sidewalls, and extending upwardly;

(e) a motor drive carrying an enlarged propeller;

(f) a cage protectively surrounding the motor and propeller;

(g) an operator's seat positioned above the hull on substantially equal elevation with the motor drive;

(h) one or more rudders positioned aft of the motor drive and propeller for steering the hull; and

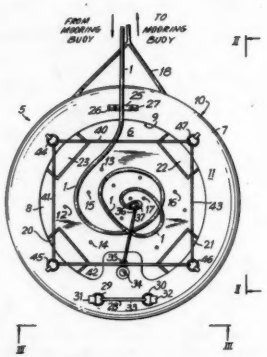
(i) the motor drive rudders, seat, and cage extending well above the hull.

4,998,899

MOORING LINE FLOTATION DEVICE

David B. Wood, 44 Knollwood Rd., Huntington, N.Y. 11743, and Harold E. Wood, Jr., 20 Fairwind Ct., Northport, N.Y. 11768

Filed Oct. 23, 1989, Ser. No. 424,913
Int. Cl.[5] B63B *22/02*
U.S. Cl. 441—3 **16 Claims**



1. A mooring line flotation device for maintaining a mooring line extending from an offshore structure above the surface of a body of water when the mooring line is not in use, said flotation device comprising

a raft-like float having an open center, a buoyant bordering member around said center and a perforated platform member extending across said center above the surface of said body of water when said float is afloat, said buoyant bordering member having an inside surface around said center, an outside surface spaced from and substantially opposite said inside surface and an upper surface extending between said inside and outside surfaces; and

coupling means affixed to said float for releasably affixing said float to said offshore structure in close proximity therewith, whereby a mooring line extending from said structure is supported, when not in use, by said platform member in substantially dry and readily available condition for use when desired, said coupling means being affixed to the outside surface of said buoyant bordering member and said platform member enclosing said center and being bordered by said inside surface.

4,998,900

SELF-RIGHTING INFLATABLE LIFE RAFT

Derek Wright, 962 Plymouth Pl., North Vancouver, B. C., Canada V7H 2J2

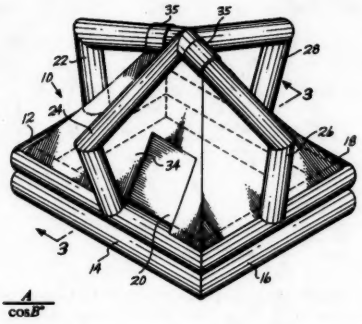
Continuation-in-part of Ser. No. 386,446, Jul. 28, 1989, abandoned. This application Jun. 19, 1990, Ser. No. 540,183
Int. Cl.[5] B63B *35/58*
U.S. Cl. 441—38 **3 Claims**

1. A self-righting inflatable life raft, comprising:

a raft body including inflatable sidewalls and having determinable beams measured between opposite outboard edges of said sidewalls, said sidewalls having an upper edge and a sheer line being defined substantially between sidewalls at said upper edge, said sheer line having a midpoint substantially centered between the sidewalls;

a means for righting said raft body including a plurality of inflatable tube portions each having a central longitudinal axis which extends from said upper edge to a first predetermined position upwardly and outboard from the upper edge and which then extends inboard to centrally converge with another of said inflatable tube portions at a second predetermined position above said sheer line,

said first position being spaced outboard at least a horizontal distance substantially determined by the equation:



said first position being spaced upwardly above the sheer line at least a vertical distance substantially determined by the equation:

$$\sqrt{(C + D \cdot \tan E^{\circ})^2 - C^2}$$

said second position being spaced vertically above the sheer line midpoint at least a distance substantially determined by the equation:

$$C' + (D \cdot \tan E')$$

where:

A=the distance from the sheer line midpoint to the axial center of the tube portion at the upper edge of the sidewall; and

B=one-half the angle in degrees between the axial center of adjacent tube portions at said upper edge, said angle having its vertex at the sheer line midpoint;

C=one-half of a major beam of the raft body;

C'=one-half of a minor beam of the raft body;

D=the vertical height of the sidewall; and

E=the minimum angle in degrees beyond vertical that the sheer line must be tilted to cause the raft body to topple by gravity to an upright position;

said righting means being sized to provide buoyancy at least equal to the mass of the raft.

4,998,901

METHOD AND APPARATUS FOR MAKING FLAT TENSION MASK COLOR CATHODE RAY TUBES

Robert Adler, Northfield; James R. Fendley, Arlington Heights; Howard G. Lange, Prospect Heights; Charles J. Prazak, III, Elmhurst; Johann Steiner, Des Plaines, and Paul Strauss, Chicago, all of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Continuation-in-part of Ser. No. 370,204, Jun. 22, 1989, which is a continuation-in-part of Ser. No. 223,475, Jul. 22, 1988, Pat. No. 4,902,257. This application Sep. 8, 1989, Ser. No. 405,378

Claims priority, application European Pat. Off., Jul. 21, 1989, S89/03156

Int. Cl.[5] **H01J** *9/00, 29/07*

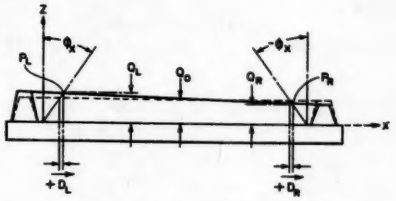
U.S. Cl. 445—3 **7 Claims**

1. In the manufacture of a tension mask color cathode ray tube, the method comprising:

providing a foil tension mask having a central pattern of apertures;

providing a front panel having a cathodoluminescent screen pattern on a flat inner surface thereof corresponding to said mask pattern, and having a plurality of mask support means having respective mask receiving surfaces for receiving a shadow mask in tension, said mask support means being located on opposed sides of said screen pattern;

determining the Q-height of said mask receiving surfaces relative to said front panel inner surface and developing Q-height error data containing information indicative of Q-height errors of said mask receiving surfaces relative to said panel inner surface;



expanding and positioning said mask such that its aperture pattern is registered with said screen pattern, said expanding and positioning being responsive in part to said Q-height error data such that said registry accounts for said Q-height errors; and

securing said mask to said panel under tension with said mask and screen pattern in registry.

4,998,902

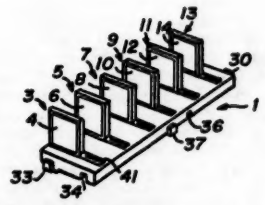
TOPPLING TOY

Harold E. Garner, Long Beach; Merrill M. Miller, Lomita; Brian E. Kavanagh, San Pedro, and Gorden W. Spring, Long Beach, all of Calif., assignors to Universal Product Innovations, Inc., Carson, Calif.

Filed Mar. 5, 1990, Ser. No. 488,709

Int. Cl.[5] **A63H** *33/04, 33/00;* **A63B** *71/00;* **A63F** *1/02*

U.S. Cl. 446—2 **27 Claims**



1. A toppling toy, comprising a track having an upper surface, a series of tiles each being pivotally mounted to said track to permit said tiles to swivel between a generally upstanding position, said tiles being spaced apart a distance to permit a toppling tile to engage an adjacent upstanding tile and cause said adjacent tile to tip over to create a domino effect with the tiles of said series; and reset means for resetting said tiles from said down position to an upstanding position, said means comprising:

a plurality of actuators, one associated with and coupled to a corresponding one of said tiles for joint pivotal movement with said associated tile about a common pivot axis;

each said actuator being pivotally mounted on said track with its pivot axis oriented transverse said track;

each said actuator containing an outer surface exposed on the upper surface of said track to a players finger, said track having sufficient width to accommodate said actuator and a player's finger said outer surface of said actuator having a frictional characteristic, whereby dragging movement of the players finger along the upper surface of the track and across and in a direction transverse the

actuator axis of pivot creates a torque thereon for pivoting the actuator to thereby upright said associated tile.

4,998,903

TOY ACTUATION SYSTEM

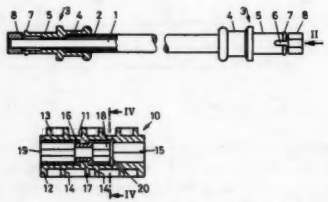
Peter Bolli, Steinhausen, and Werner Tanner, Baar, both of Switzerland, assignors to Interlego A.G., Switzerland

Filed Jul. 8, 1985, Ser. No. 752,936

Claims priority, application Switzerland, Jul. 11, 1984, 3366/84

Int. Cl.[5] A63H *33/08*

U.S. Cl. 446—102 13 Claims



1. A toy actuation system for construction sets and especially for toy models, comprising a driving unit having a casing adapted to be connected to a rotary power source, a flexible transmission shaft having an inner core and an outer protective hose, said shaft being adapted to be connected by one end thereof with said driving unit, and an actuating unit having a casing adapted to be connected with the other end of said shaft, said actuating unit including means for supplying rotational or translational actuating power, said connections of said flexible transmission shaft with said driving unit and said actuating unit being achieved in a releaseable manner by means of respective plug-in couplings, said core and said protective hose of said flexible shaft comprising each at each end of said flexible shaft respective first and second plug-in elements,

wherein said first plug-in element provided on said core of said flexible shaft at each end thereof is a pin of cruciform cross-section secured to said core,

wherein said second plug-in element provided on said protective hose of said flexible shaft at both ends thereof is a sleeve secured to said hose an outer end portion of said sleeve projecting beyond said hose and being provided with a resilient bead and with axially extending slits, and wherein said driving unit and said actuating unit each comprise a cylindrical coupling element supported in said respective casing for rotational motion, said coupling element being provided at least at one end thereof with a connecting bore having a cruciform cross-section corresponding to and for receiving said first plug-in element provided on said core of said flexible shaft, and said casings of said driving unit and said actuating unit each have at least at one end thereof a connecting socket comprising an annular groove for receiving said annular bead of said second plug-in element provided on said protective hose of said flexible shaft, thereby releasably retaining said second plug-in element in said connecting socket.

4,998,904

HARVESTER THRESHER

Hermann Kersting, Oelde-Lette, Fed. Rep. of Germany, assignor to Claas OHG, Harsewinkel, Fed. Rep. of Germany

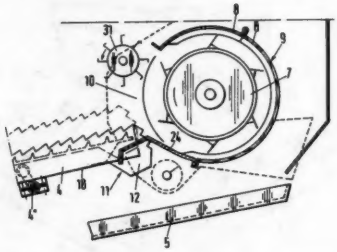
Filed Apr. 18, 1989, Ser. No. 340,557

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1988, 3814036

Int. Cl.[5] A01F *12/10, 12/385*

U.S. Cl. 460—70 13 Claims

1. A harvester thresher, comprising a housing; threshing means accommodated in said housing; a plurality of straw shakers located after said threshing means and having a discharge end; threshing and separating device located after said straw shakers; and means for transferring an agricultural product from said straw shakers to said threshing and separating device and including a transferring element fixedly connected



with said discharge end of each of said shakers for transferring the agricultural product from each of said shakers to said threshing and separating device, and a transfer bottom associated with each of said transferring elements.

4,998,905

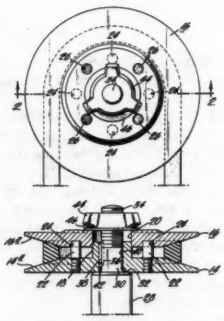
MULTIPLE SPEED PULLEY ASSEMBLY

Gregory D. Martin, Sheboygan Falls, Wis., assignor to Lawn-Boy, Inc., Plymouth, Wis.

Filed May 3, 1990, Ser. No. 518,153

Int. Cl.[5] F16H *55/36*

U.S. Cl. 474—42 8 Claims



1. An adjustable V-belt pulley comprising first and second separable pulley halves, said pulley halves having juxtaposed frusto-conical faces adapted to receive a V-belt therebetween, a plurality of spaced lugs extending axially from said first pulley half, and a plurality of sets of cavities in said second pulley half, each said cavity set being adapted to receive said lugs of said first pulley half, each cavity set having a different cavity depth, and means for demountably securing said pulley halves together with said lugs disposed in a selected one of said sets of cavities, the effective diameter of said pulley being determined by the selection of the set of cavities into which said lugs are disposed.

4,998,906

TOOTH BELT DRIVE, ESPECIALLY FOR INTERNAL COMBUSTION ENGINES

Hans Moss, Hovås, Sweden, assignor to AB Volvo, Gothenburg, Sweden

Filed Oct. 10, 1989, Ser. No. 424,404

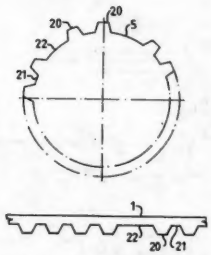
Claims priority, application Sweden, Oct. 10, 1988, 8803589

Int. Cl.[5] F16H *5/20, 55/02*

U.S. Cl. 474—153 8 Claims

1. Tooth belt drive, comprising at least one driving tooth

pulley and at least one driven tooth pulley and a tooth belt running around said pulleys, each of said belt and pulleys having a series of teeth, at least one said series of teeth having at at least one location (22) an interruption in an otherwise



uniform normal pitch, at which location the pitch between two consecutive operative teeth (20) is at least twice said normal pitch and the height of the belt or pulley between said two teeth is less than the height of said two teeth.

4,998,907

CONNECTING PIN AND METHOD USING THE CONNECTING PIN

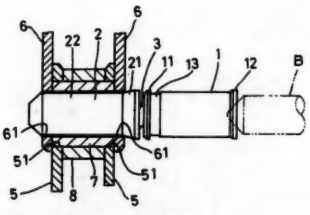
Keiichi Sawada, Osaka, and Masashi Nagano, Izumi, both of Japan, assignors to Shimano Industrial Company Limited, Osaka, Japan

Filed Jan. 29, 1990, Ser. No. 471,782

Claims priority, application Japan, Jan. 30, 1989, 1-10039[U]

Int. Cl.[5] F16G *5/18*

U.S. Cl. 474—206 **10 Claims**



1. A connecting pin comprising:

a pin body for connecting a plurality of connecting members at least one of which defines a through hole;

an inserting portion attached to a longitudinal end of said pin body, said inserting portion having a tapered portion insertible into and retainable at said through hole; and

a detachable connecting portion provided between said pin body and said inserting portion for detachably connecting the same.

4,998,908

TRANSMISSION CHAIN FOR A CONTINUOUSLY VARIABLE CONICAL PULLEY DRIVE

Martinus H. Cuypers, Eindhoven, Netherlands, assignor to Van Doorne's Transmissie B.V., Tilburg, Netherlands

Filed Oct. 10, 1989, Ser. No. 418,860

Claims priority, application Netherlands, Oct. 31, 1988, 8802669

Int. Cl.[5] F16G *1/24*

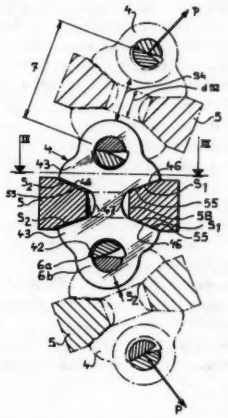
U.S. Cl. 474—245 **5 Claims**

1. Transmission chain (1) with a number of links closed to form an endless chain for a continuously variable conical pulley drive, comprising in each link a set of laminal link-plates (4) situated parallel and adjacent to each other, and provided with two link-plate openings (42) situated at pitch distance (7) from each other, hinge pins (6, 6*a*, 6*b*) running at right angles to the link-plate face and inserted through the adjacent link-plate openings, a link-plate of one link and of the following link being disposed essentially alternately round each hinge pin, while the chain ends are connected to each other to form an endless chain,

and also comprising at least one transverse-plate (5) per link, said transverse-plate being essentially of constant thickness and being trapezoidal, and having a rectangular window (54) whose long sides (58) run parallel to the parallel sides (56, 57) of the trapezium, and the short sides (59) of the window being of such length that the adjacent link-plates (4) of a link can be inserted with slight play through the window and are situated at such a distance from each other that the whole set of adjacent link-plates can be accommodated with some play,

and in which the two short sides (52) of each transverse-plate (5) form end surfaces (53) which mate as friction faces with the conical surfaces of the conical pulleys,

and in which each transverse-plate (5) is confined in the lengthwise direction of the chain relative to the accommodated set of link-plates by two cams (43) per longitudinal side of each link-plate which are situated in the link-plate



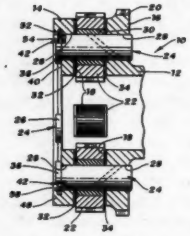
face, and which project on either side of the centre of the link-plate and form a groove (44) between them, the centre line of which lies at right angles to the centre line of the link-plate, and in that the greatest width of the link-plate measured between a top of a first cam and a top of a second cam opposite said first cam is smaller than an oblique distance through the window in the transverse-plate during fitting (removal) of a set of link-plates in (from) the window of the transverse-plate, while all the link-plates but one are pushed slantingly or vertically next to and against each other to one side of the window in the transverse-plate and the last link-plate can be fed or swung in the above-mentioned slanting position parallel to itself into (out of) the window characterized in that at least one of the grooves in the link-plates widens in a v-shape towards the top of the cams, and in that the faces (56) of at least one of the long sides (51) of each transverse-plate (5) are provided with matching v-shaped side faces (55), while the innermost v-shaped side faces (46) of the link-plates (4) and the transverse-plate (5), in the radial direction relative to a chain mounted in a transmission, mate without plate as self-locating and self-centering bearing faces during operation while passing through an enveloped arc in said conical pulleys.

4,998,909

PLANET CARRIER ASSEMBLY

Reece R. Fuehrer, Danville, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Apr. 23, 1990, Ser. No. 513,410
Int. Cl.[5] F16H 3/44
U.S. Cl. 475—331 2 Claims



1. A planet carrier assembly comprising: a pair of side plates disposed in axial spaced relation, each side plate having a plurality of apertures of substantial equal diameter; means for securing the side plates with the apertures in one of said side plates in axial alignment with the apertures in the other of said side plates; a plurality of spindle means having a constant diameter body portion, shoulder means adjacent one end of the body portion and locating flat means formed in a segmental space in said one end of said body portion; a locating surface on said one side plate coaxial with and adjacent each aperture in said one side plate and extending radially therefrom; said spindle means being disposed respectively in each pair of said apertures with said shoulder means being in abutment with said locating surface; a pinion gear rotatably supported on each of said spindle means; a retainer plate having alignment surface means disposed adjacent and radially outward from said locating flat means on each of said spindles for cooperating therewith to prevent rotation of said spindles in said apertures; and a retaining ring secured in said one side plate in axial abutment with said retainer plate and cooperating therewith to prevent axial movement to said spindles in one axial direction and said shoulder means cooperating with said locating surface to prevent axial movement of said spindles in an opposite axial direction.

4,998,910

PACKAGING CONTAINER EJECTION APPARATUS

John M. Mohaupt, Minneapolis, and Mark R. Riemenschneider, St. Paul, both of Minn., assignors to R. A. Jones & Co. Inc., Covington, Ky.

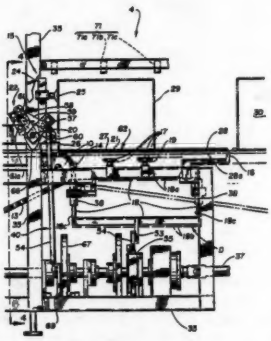
Continuation of Ser. No. 40,906, Apr. 21, 1987, Pat. No. 4,917,659. This application Jul. 14, 1989, Ser. No. 380,014
Int. Cl.[5] B31B 1/78
U.S. Cl. 493—12 3 Claims

3. The method of ejecting tubular boxes having top, bottom and side walls comprising the steps of:

conveying a flat folded box to an erecting station,

pulling the adjoining bottom and trailing side walls apart toward a condition in which said box is squared with 90° corners,

detecting a box that fails to open to a squared condition,



collapsing a failed box,

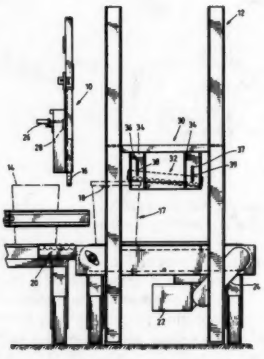
grasping lateral edges of a collapsed box and ejecting it transversely to the conveying direction.

4,998,911

LID ALIGNMENT AND FIXING APPARATUS

Robert H. Reeves, Jr., Freeport; Charles R. Cox, Brazoria, and Hilario Montes, Freeport, all of Tex., assignors to Velasco Scale Company, Freeport, Tex.

Filed Apr. 18, 1989, Ser. No. 340,065
Int. Cl.[5] B65G 47/244
U.S. Cl. 493—108 20 Claims



1. An apparatus for orienting a lid section of a container to a preselected angular position and mating said lid section to a pail section of a container, said lid section having a bunghole of a preselected diameter positioned at a preselected radial distance from the center of said lid section, said bunghole being defined by an annular wall connected to and extending a preselected distance from a lower surface of said lid section, the apparatus comprising:

a frame having a pair of rails spaced a preselected distance apart and connected together via a first plate;

said first plate having a central passage extending therethrough, an upper section of said passage having a preselected width at least twice the preselected radial distance, a lower section of said passage having a preselected width at least as wide as said bunghole diameter, said first plate having a first surface adapted for receiving said lid section whereby said bunghole extends into said central passage;

a gating mechanism positioned within said central passage intermediate the upper and lower sections of said passage and adapted for receiving said bunghole and urging said bunghole and lid section toward a position at which said bunghole is located at the upper center location of said lid section; and

means for moving said gating mechanism between first and second preselected positions, said first preselected position being where said gating mechanism is substantially adjacent the first surface of said first plate and the second preselected position being where said gating mechanism is spaced a preselected distance from the first surface of said first plate whereby said gating mechanism receives the bunghole in the first position and releases the bunghole in the second position.

4,998,912

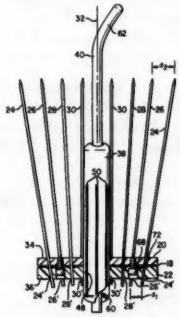
DIVERGING GYNECOLOGICAL TEMPLATE

Edward C. Scarbrough, Irving; Pietro P. Antich, Richardson; Berchmans John, Grand Prairie, and Phuc D. Nguyen, Dallas, all of Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed Mar. 2, 1989, Ser. No. 317,775

Int. Cl.[5] A01N *5/00*

U.S. Cl. 600—6 **25 Claims**



1. Apparatus for the divergent guiding of needles during interstitial implants through the skin, comprising:

a template having a proximal surface and a distal surface opposite said proximal surface;

a plurality of elongate needle guiding holes formed in said template from said distal surface to said proximal surface sized to slidably receive respective needles;

said template having an central vertical axis substantially perpendicular to said proximal surface, said holes comprising at least a first group and a second group, an area on said proximal surface including said first and second groups, each hole of said first group spaced from said axis and forming a first angle therewith that diverges from said distal surface to said proximal surface; and

each hole of said second group spaced from said axis and diverging from said distal surface to said proximal surface at a second angle with respect to said axis which is greater than said first angle.

4,998,913

ELECTRONIC STIMULATING DEVICE

John A. Atwood, Jr., 916 Perrin Dr., Arabi, La. 70032

Filed Apr. 14, 1989, Ser. No. 338,312

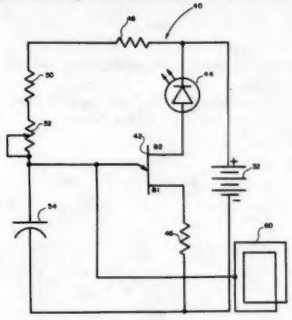
The portion of the term of this patent subsequent to Feb. 19, 2008, has been disclaimed.

Int. Cl.[5] A61N *1/00*

U.S. Cl. 600—14 **7 Claims**

1. An electronic stimulating device, comprising:

a relaxation oscillator circuit for producing distorted wave shapes and a power source for said circuit; said relaxation oscillator circuit comprising a light-emitting diode connected to the power source, a unijunction transistor comprising emitter/base structure connected through emitter base 1 to a resistor and through emitter base 2 to the light-emitting diode, a resistor means for controlling



oscillator frequency connected in parallel to said light-emitting diode, to a capacitor; and an antenna connected between said resistor means and the capacitor to said transitor; and a lightweight portable housing means for housing the relaxation oscillator circuit.

4,998,914

PROCEDURE FOR THE PERFUSION OF CAVITIES IN OBJECTS AND DEVICE FOR EXECUTING THE PROCEDURE

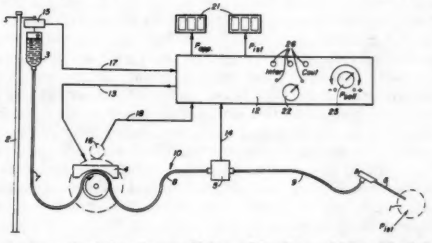
Peter P. Wiest, Hessenallee 8, 1000 Berlin 19, and Hubert Fuchs, Berlin, both of Fed. Rep. of Germany, assignors to Peter P. Wiest, Berlin, Fed. Rep. of Germany

Filed Feb. 6, 1989, Ser. No. 307,675

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1988, 3805368

Int. Cl.[5] A61M *31/00*

U.S. Cl. 604—67 **12 Claims**



1. A method for the perfusion of body cavities with fluid supplied from a dispenser reservoir via a perfusion line and a medical instrument by a pump including a pressure sensor connected between the pump and the medical instrument and a control unit connected to the pressure sensor and connected to the pump, comprising the steps of:

determining the conductance of the fluid line between the pressure sensor and the medical instrument and determining the conductance of the medical instrument to provide the overall conductance G;

connecting the medical instrument to the body cavity of a patient;

initiating perfusion of fluid via the perfusion line and medical instrument;

determining the pressure P_{GEM} sensed by the pressure sensor;

determining the volumetric rate of flow V;

determining the actual fluid pressure in the body cavity P_{IST} based on the pressure PGEM sensed, the volumetric rate of flow V and the overall conductance G; and

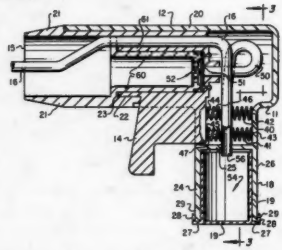
attaining and maintaining the actual pressure P_{IST} equal to a preset value of the volumetric rate of flow V through continuous adjustment of the volumetric rate of flow V based on the overall conductance G.

4,998,915

ASPIRATING DEVICE

Ralph E. Hannah, Sandy, Utah, assignor to Unimed, Inc., Salt Lake City, Utah

Filed Feb. 1, 1990, Ser. No. 473,328
Int. Cl.[5] A61M *1/00*
U.S. Cl. 604—73 **6 Claims**



1. A hand-held aspirating device comprising a main housing having a handle and a barrel, said barrel having a front end and a rear portion, said handle having a lower end and an upper end communicating with said rear portion of said barrel; actuating means extending from said main housing beneath said barrel, means operatively associated with said actuating means to normally maintain said actuating means in an extended position, said actuating means being actuable in a direction generally parallel to said barrel to move said actuating means rearwardly toward said handle; suction means including a suction chamber disposed within said housing and responsive to the actuation of said actuating means for creating a suction within said suction chamber; a container means for receiving aspirate, said container means being removably connected to said handle; a first conduit within said housing, said first conduit having two ends, one of said ends normally being in fluid-flow communication with said container means and the other end being connected to said suction chamber; a second conduit depending from said front end of said barrel and projecting outwardly therefrom, said second conduit having two ends, one for inserting into a body cavity, the other one end being in fluid-flow communication with said container means; whereby when said actuating means is actuated and said suction is created within said suction chamber, said suction is communicated through said first conduit from said suction chamber to said container means and thence through said second conduit to said one of said two ends of said second conduit thereby to aspirate fluids from said body cavity through said second conduit into said container means.

4,998,916

STEERABLE MEDICAL DEVICE

Julius G. Hammerslag, 27011 Calle Esperanza, San Juan Capistrano, Calif. 92675, and Gary R. Hammerslag, 33171 Elisa Dr., Dana Point, Calif. 92624

Continuation-in-part of Ser. No. 295,124, Jan. 9, 1989, Pat. No. 4,921,482. This application Jan. 4, 1990, Ser. No. 461,049
Int. Cl.[5] A61M *37/00*
U.S. Cl. 604—95 **32 Claims**

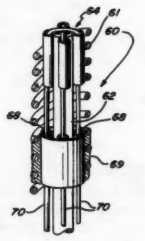
1. A steerable guidewire for percutaneous transluminal insertion into the coronary vascular system and controlled negotiation of branches and turns therein to guide an angioplasty catheter to an arterial stenosis or other treatment site, said guidewire comprising:

an elongate flexible shaft having a proximal and a distal end and at least one lumen extending therethrough, said distal end being provided with a floppy, resilient tip;

a deflection wire guide disposed within a steering region on the distal end of said flexible shaft, said wire guide secured to substantially prevent axial displacement thereof;

a deflection wire anchor disposed within the steering region distally of the wire guide; and

at least three deflection wires axially movably disposed within the lumen of said flexible shaft and extending from a distal point of attachment to the wire anchor throughout the length of the flexible shaft to the proximal end thereof;



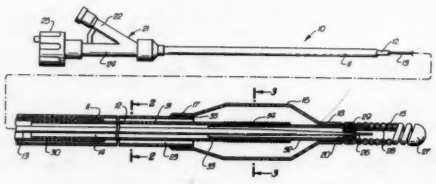
wherein axial movement of any one of said deflection wires in a proximal direction displaces the axis of the steering region in a unique lateral direction, and through combinations of proximal axial displacement of said deflection wires, said steering region is caused to deflect laterally and rotate throughout a full 360° range of motion about the axis of the flexible shaft.

4,998,917

HIGH TORQUE STEERABLE DILATATION CATHETER

John W. Gaiser, and Abdul-Razaq A. Balogun, both of Mountain View, Calif., assignors to Advanced Cardiovascular Systems, Inc., Santa Clara, Calif.

Continuation-in-part of Ser. No. 199,099, May 26, 1988, Pat. No. 4,940,062. This application Dec. 21, 1988, Ser. No. 287,772
Int. Cl.[5] A61M *29/00*
U.S. Cl. 604—96 **19 Claims**



1. A steerable balloon dilatation catheter suitable for angioplasty procedures, comprising:

(a) a thin-walled tubular outer member formed of plastic material having an inner lumen extending therethrough;

(b) a tubular inner member disposed within the inner lumen of the outer tubular member and having an inner lumen extending therethrough with an axial opening at the distal tip thereof with a distal tubular portion of the inner tubular member having a thin wall and being formed of high strength plastic material providing longitudinal flexibility and diametric rigidity and a proximal tubular portion being formed of hypotubing to provide improved pushability;

(c) an inflatable, relatively inelastic balloon member on the distal portion of the catheter assembly with the proximal end of the balloon member being sealingly secured to the distal end of the outer tubular member, the distal end of the balloon member being sealingly secured to the distal end of the inner member and the interior of the balloon member being in fluid communication with an annular lumen disposed between the inner and outer tubular members; and

(d) an elongated core member disposed within the inner

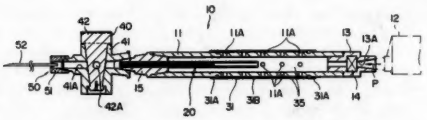
lumen of the inner tubular member with a distal portion thereof extending out of the axial opening in the distal tip thereof and having a flexible body disposed therearound, said core member being axially rotatable within the inner lumen of the inner member but fixed to prevent significant longitudinal movement of the core member within said inner lumen.

4,998,918

CONTINUOUS INJECTOR OF LIQUID MEDICINE

Shinji Mimura, Saitama, Japan, assignor to Kabushiki Kaisha Mimura Sogo Kenkyuusho, Japan

Filed Jun. 30, 1989, Ser. No. 374,017
Int. Cl.[5] A61M *37/00*
U.S. Cl. 604—132 **13 Claims**



1. A continuous liquid medicine injector, comprising:

an injector body formed with a liquid medicine accommodating portion;

pressurizing means for applying pressure to a liquid medicine accommodated in said liquid medicine accommodating portion; and

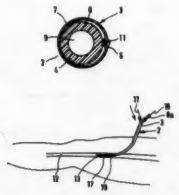
flow rate control means mounted within the injector body and an instrument inserted into a human body through which the liquid medicine in said liquid medicine accommodating portion is forced into a human body by means of the pressure applied by said pressurizing means, wherein said flow rate control means includes a thin tube having a predetermined inner diameter and a predetermined length, the flow rate of the liquid medicine being controlled by the passage of said liquid medicine through said thin tube.

4,998,919

THROMBECTOMY APPARATUS

Wolfram Schnepp-Pesch, Schönblick 6, 7505 Ettlingen, and Josef Lindenberg, Käthe-Kollwitz-Str.10a, 7500 Karlsruhe, both of Fed. Rep. of Germany

Filed Oct. 18, 1988, Ser. No. 259,301
Claims priority, application Fed. Rep. of Germany, Oct. 31, 1987, 8714529[U]
Int. Cl.[5] A61M *25/01*
U.S. Cl. 604—164 **16 Claims**



1. An apparatus for thrombectomy with partial dissolving of a thrombus by a thrombus dissolving liquid, the apparatus comprising sheath means having at least first and second open lumens extending over an entire length of the sheath means, said first and second lumens each including proximal and distal ends, said first and second lumens are distal-parallel to one another and disposed parallel to one another over most of the length of the sheath means, the proximal ends of said first and second lumens subtend a finite angle, said first lumen has a cross-sectional area taking up virtually an entire cross-sectional area of sheath means, said second lumen has a cross-sectional area narrower than the cross-sectional area of said first lumen and is located in a widened area of a wall of said sheath means, said cross-sectional areas of said first and second lumens are substantially constant over an entire length of the parallel disposed portions thereof, said second lumen is adapted to accommodate a safety change wire means, and wherein at least one first catheter means is provided, said first catheter means being dimensioned so as to be accommodated in said first lumen.

4,998,920

PROTECTIVE ASSEMBLY FOR HYPODERMIC SYRINGE DEVICES

Delores Johnson, 6920 Summerfield Dr., Indianapolis, Ind. 46214

Filed Oct. 11, 1989, Ser. No. 421,119
Int. Cl.[5] A61M *5/32*
U.S. Cl. 604—198 **12 Claims**

1. A syringe device comprising:

a syringe barrel adapted to retain a fluid therein, the barrel having an open proximal end and an opposing distal end, the distal end having an orifice formed therein, the orifice being adapted to communicate with a tubular needle through which fluid is passed;

plunger means adapted to be carried within the barrel and defining an inner chamber therein in which fluid is retained, the plunger means being adapted to move reciprocably within the barrel to effect the passing of fluid into or out of the inner chamber through said orifice;

an externally threaded collar member adapted to be mounted on the barrel adjacent the distal end of the barrel and having a slot formed as an integral part thereof;

a protective sleeve member adapted to be arranged circumjacent the barrel, the sleeve member having an inner diameter greater than the outer diameter of the barrel so as to allow the sleeve member to move axially about the barrel, the sleeve member having an open proximal end and an open distal end and an internally threaded portion disposed adjacent the proximal end, said internally threaded portion being adapted to threadably engage said externally threaded collar member and having a tab formed as an integral part thereof, said slot and said tab being arranged substantially transversely to the direction of intended rotation;

means for fixedly securing the sleeve member in a desired position, said securing means being defined by the tab of the internally threaded portion and the slot of the externally threaded portion,

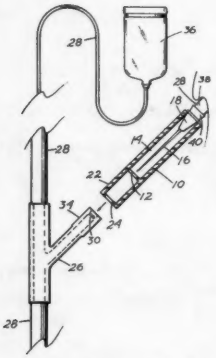
the sleeve member being adapted to be moved axially from a first retracted position in which the needle is sufficiently exposed to effect the injection or aspiration of fluid to a second extended position in which the needle is located within the sleeve member, the sleeve member being adapted to move axially and rotatably so that the internally threaded portion of the sleeve member engages the externally threaded collar member, the rotation of the sleeve member relative to the barrel eventually aligning the tab with the slot whereat the tab enters and is received by the slot, thereby preventing further rotational or longitudinal movement of the sleeve member relative to the barrel and fixedly securing the sleeve member in the second extended position where the distal end of the sleeve member extends beyond the needle to prevent inadvertent contact therewith.

4,998,921

INTERMITTENT I.V. THERAPY NEEDLE SHEATH

Harold C. Vickroy, 1980 Liliano Dr., Sierra Madre, Calif. 91024, and Nancy Zera, P.O. Box 43, Campbell, Calif. 95009

Filed Nov. 20, 1989, Ser. No. 439,105
Int. Cl.[5] A61M *5/178*
U.S. Cl. 604—167 **1 Claim**



1. A tubular sheath encasing an I.V. therapy needle with attached needle hub, comprising an elongated single annular wall forming a tubular member, said tubular member having a first end and an oppositely disposed second end, said tubular member having an attached internally positioned septum dividing said tubular member into one longer compartment and one shorter compartment, said septum structured of sufficiently soft material to allow puncturing thereof by said I.V. therapy needle, said soft material of said septum further being sufficiently resilient to seal a puncture made therein by said I.V. therapy needle upon withdrawal of said I.V. therapy needle therefrom, said needle hub attached within said longer compartment at said second end of said tubular member, one end of said needle hub positioned adjacent said second end of said tubular member so as to allow attachment of a syringe to said needle hub, said I.V. therapy needle extending from one end of said needle hub toward said septum, and terminating adjacent said septum within said longer compartment, said first end of said tubular member being an open end in communication with said shorter compartment, said tubular member having an interior annular lip affixed adjacent said first end, said tubular member structured of material being sufficiently flexible to allow said tubular member to be longitudinally collapsible, said I.V. therapy needle positioned within said longer compartment to puncture said septum and enter said shorter compartment upon longitudinal collapsing of said tubular member, said tubular member structured of said material further being sufficiently resilient to automatically resume an elongated original position after collapsing thereof and release of the collapsing pressure thereby retracting said I.V. therapy needle back into said longer compartment, said material structuring said tubular member further being transparent to allow viewing of said I.V. therapy needle and said septum therethrough.

4,998,922

SAFETY SYRINGE CAP MINIMIZING NEEDLE-STICK PROBABILITY

Thomas C. Kuracina, 15974 Maricopa Hwy., Ojai, Calif. 93023, and Randall Ohnemus, 6292 Bell St., Ventura, Calif. 93003

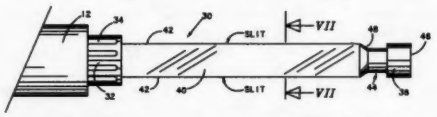
Filed Feb. 23, 1990, Ser. No. 484,915
Int. Cl.[5] A61M *5/32*
U.S. Cl. 604—192 **17 Claims**

1. In a hypodermic syringe having a barrel with a needle extending outward therefrom, a retractable safety cap for covering the needle to prevent accidental needle-stick therefrom comprising a unitary cap assembly of a resiliently flexible plastic material including:

(a) a hub portion disposed concentrically about a base portion of the needle and attached to the barrel;

(b) a sliding safety hub portion having a bore therethrough slidably disposed with the needle passing through said bore and extending over a point end of the needle; and,

(c) a plurality of slats extending between said hub portion



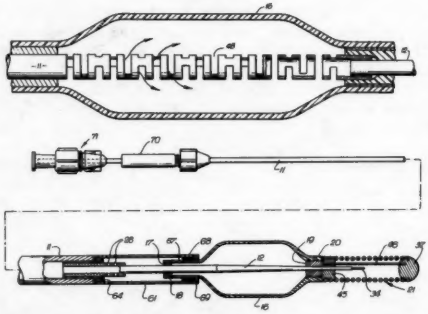
and said sliding safety hub portion, said slats being spaced from one another along adjacent edges thereof at radially equal intervals about the periphery of the needle and being parallel to the needle whereby a longitudinal compressive force against said sliding safety hub portion is resisted by a longitudinal compressive resistance of said slats which must be overcome before said slats will deform and flex outward from the needle to allow said sliding safety hub portion to slide along and expose the needle for use.

4,998,923

STEERABLE DILATATION CATHETER

Wilfred J. Samson, Saratoga, and William S. Tremulis, Redwood City, both of Calif., assignors to Advanced Cardiovascular Systems, Inc., Santa Clara, Calif.

Continuation-in-part of Ser. No. 231,215, Aug. 11, 1988, which is a continuation-in-part of Ser. No. 760,636, Jul. 30, 1985. This application Dec. 23, 1988, Ser. No. 289,919
Int. Cl.[5] A61M *29/02*
U.S. Cl. 606—194 **26 Claims**



1. A steerable dilatation catheter having an inflatable balloon on the distal portion thereof, comprising:

(a) an elongated torquable member extending along the length of the catheter including,

an elongated, tubular element formed of high-strength material having proximal and distal extremities and an inner lumen extending along the length thereof in fluid communication with at least one inflation port for inflation fluid provided in the distal extremity thereof, and

a guide element secured to the distal extremity of the elongated tubular element;

(b) the inflatable balloon which is secured at both the proximal end and the distal end thereof to the guide element of the elongated torquable member to prevent the relative rotational movement therebetween;

(c) a flexible elongated tubular extension which is disposed about the torquable member, which is secured by the proximal end thereof to the distal end of the elongated tubular element and which is in fluid communication with at least one inflation port in the tubular member and the interior of the inflatable balloon;

(d) an elongated flexible member which is disposed about a portion of the guide element extending distally of the balloon; and

(e) means on the proximal portion of the torquable member to axially rotate the torquable member.

23. A steerable dilatation catheter having an inflatable balloon on the distal portion thereof, comprising:

(a) an elongated torquable member extending along the length of the catheter including,

an elongated, tubular element formed of high-strength material having proximal and distal extremities, an inner lumen extending along the length thereof in fluid communication with a plurality of radially oriented slots in the distal extremity thereof, and

a guide element secured to the distal extremity of the elongated tubular element;

(b) the inflatable balloon secured by at least the proximal end thereof to the distal extremity of the elongated tubular element to prevent the relative rotational movement therebetween, the portion of the tubular element having radial slots being disposed within the interior of the balloon;

(c) an elongated flexible member which is disposed about portions of the guide element which extend distally of the balloon; and

(d) means on the proximal portion of the torquable member to axially rotate the torquable member.

4,998,924

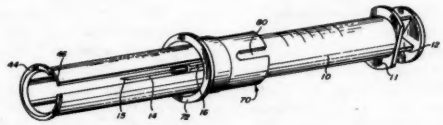
DOUBLE SLEEVE SAFETY SYRINGE

Alan B. Ranford, St. Louis, Mo., assignor to Sherwood Medical Company, St. Louis, Mo.

Continuation of Ser. No. 385,343, Jul. 25, 1989, abandoned. This application May 2, 1990, Ser. No. 519,345

Int. Cl.[5] A61M *5/32*

U.S. Cl. 604—798 **32 Claims**



1. A safety syringe, comprising

a syringe having proximal and distal ends and including a generally elongate tubular barrel section extending therebetween, and a needle attached to the distal end of the barrel section,

a locating ring having a body section attached to the distal end of said barrel section and including an outwardly extending projecting means extending therefrom,

an elongate first sleeve having proximal and distal ends movable over said barrel section and locating ring between a retracted position wherein the needle is exposed and an extended position wherein said first sleeve surrounds the needle, said first sleeve including an elongate slot therein extending proximally from the distal end of said first sleeve and wherein the projecting means of said locating ring extends therethrough, and

a second sleeve having proximal and distal ends and which is movable over said first sleeve wherein said second sleeve cooperates with said projecting means on said locating ring to retain the first sleeve therebetween in the extended position.

4,998,925

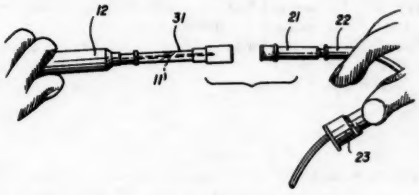
I. V. CONNECTOR

Habib Al-Sioufi, P.O. Box 654, Brookline, Mass. 02146, and Antoine J. Koudsi, 52 Blueberry Cir., Pelham, N.H. 03076

Filed May 24, 1988, Ser. No. 198,293

Int. Cl.[5] A61M *25/00*

U.S. Cl. 604—283 **3 Claims**



1. An I.V. system for withdrawing from or injecting into a body material which system comprises in combination: an elongated catheter tube with means at one end for insertion into said body, and one or more means disposed along said tube or at the other terminus thereof for connecting said tube with a reservoir for said material, said connecting means including an I.V. needle disposed within and completely covered by an elongated sleeve with an open end for receiving said catheter and engaging it with said needle within said connector means such that a fluid passage is provided between said reservoir and said catheter tube.

4,998,926

PARENTERAL FLUID ADMINISTRATION SET

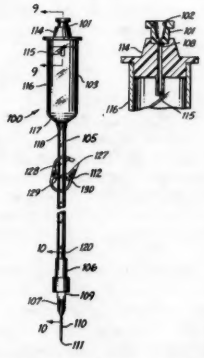
Paul G. Alchas, Montclair, N.J., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

Continuation of Ser. No. 809,093, Dec. 13, 1985, Pat. No. 4,952,210. This application Feb. 28, 1990, Ser. No. 474,180

The portion of the term of this patent subsequent to Aug. 28, 2007, has been disclaimed.

Int. Cl.[5] A61M *5/68*

U.S. Cl. 604—251 **14 Claims**



1. A non-vented parenteral fluid administration set and a vented container comprising:

a vented container including a housing having a chamber for retaining fluid and a frusto-conically shaped tip extending from the housing having a passageway therethrough communicating with said chamber;

a non-vented adapted having a frusto-conically shaped recess therein removably engaging the frusto-conically shaped tip of the vented container, said adapter having a bore therethrough communicating with said recess, said

bore being positioned to allow fluid communication between said bore and the passageway in the vented container tip when the tip engages said recess;

a drip chamber having an upper portion with a conduit therethrough and a flexible transparent body portion extending downwardly from said upper portion and terminating in a lower end, said upper portion being connected to said adapter so that said bore and said conduit are in fluid communication;

a flexible tube having a first end connected to said lower end of said body portion and a second end; and

fluid delivery means for facilitating the delivery of parenteral fluid from said tube to the patient connected to said second end of said tube.

4,998,927

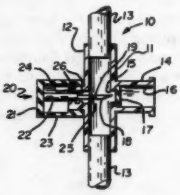
CONNECTOR

Vincent L. Vaillancourt, 14 Bunyan Dr., Livingston, N.J.

Filed Aug. 18, 1989, Ser. No. 395,762

Int. Cl.[5] A61M *25/00*

U.S. Cl. 604—283 **30 Claims**



1. A connector comprising

a housing

a hollow needle mounted in said housing;

a rubber septum disposed in said housing in facing relation to a distal end of said needle;

an adaptor extending coaxially of said needle on a side of said septum opposite said needle to define an internal chamber; and

collapsible means maintaining said needle and said septum in opposed spaced relation relative to each other and being collapsible to permit said needle to pierce through said septum into communication with said chamber during relative movement therebetween.

4,998,928

BARRIER GUARD MOISTURE-PROOF ADHESIVE

Albert Maletsky, Franklin Lakes; Denis P. Nolan, Piscataway, and Betty Jean Polito, Hawthorne, all of N.J., assignors to The International Group, Inc., Lynhurst, N.J.

Division of Ser. No. 165,980, Mar. 9, 1988, Pat. No. 4,939,202.

This application Apr. 13, 1990, Ser. No. 509,269

Int. Cl.[5] A61F *13/15*; C08L *23/00*

U.S. Cl. 604—365 **2 Claims**

1. A disposable diaper having an inner moisture permeable non-woven fibrous layer, an outer moisture impervious plastic carrying a moisture-proof coating composition, and a moisture absorbent layer disposed between said inner and outer layers, said inner layer having its inside surface bonded to the inside surface of the outer layer in the waist area beyond the moisture absorbent layer by the moisture-proof adhesive coating composition, the coating composition comprising

(a) between about 40 wt. % and about 95 wt. % of an amorphous polymer containing at least 70% propylene monomer,

(b) between about 5 wt. % and about 40 wt. % of a hydrocarbon resinous mixture of C_4 to C_{10} hydrocarbons derived from the polymerization hydrogenation of a petroleum feed space stock; and

(c) between about 8 wt. % and about 50 wt. % of a crystalline polymer containing at least 70% propylene monomer.

4,998,929

DISPOSABLE DIAPER

Margareta Björksund, Falkenberg, and Urban Widlund, Mölnlycke, both of Sweden, assignors to Molnlycke AB, Gothenburg, Sweden

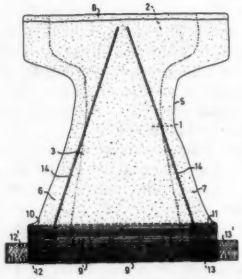
Continuation of Ser. No. 175,388, Feb. 19, 1988, abandoned.

This application Dec. 6, 1989, Ser. No. 449,372

Claims priority, application Sweden, Jul. 17, 1986, 8603154-9

Int. Cl.[5] A61F *13/16*

U.S. Cl. 604—385.2 **5 Claims**



1. An elongated disposable diaper having opposite end portions, comprising an elongated absorbent body (1) having opposite ends, a casing surrounding the absorbent body and consisting of a liquid permeable outer layer (3) intended to face the wearer's body during use of the diaper, and a liquid impermeable outer layer (4) on the opposite side of the absorbent body, said two outer layers being joined together around the absorbent body, elastic means (9, 14) to seal around the wearer's legs and waist; the elastic waist means comprising a strip (9) of an elastic and liquid-tight material, which is applied in a prestretched state onto the bodycontacting side of the absorbent body between said layers (3, 4), said elastic strip extending across the width of at least one of said diaper end portions, said elastic strip having end portions (10, 11) and having an edge portion located beyond the adjacent said end of the absorbent body and an intermediate portion (9′) between the end portions overlapping the adjacent end part of the absorbent body, said end portions (10, 11) of the elastic strip being located at opposite ends of said edge portion of said elastic strip, said elastic strip being connected via said edge portion and said end portions (10, 11) of the elastic strip to the liquid impermeable outer layer (4) both along said edge portion and laterally of said adjacent end of the absorbent body in said end portions (10, 11) of the elastic strip for creating a liquid-tight pocket in which said adjacent end of the absorbent body is disposed, one side of said pocket being comprised by said liquid impermeable outer layer and an opposite side of said pocket being comprised by said intermediate portion (9′) of said elastic strip.

4,998,930

INTRACAVITY LASER PHOTOTHERAPY METHOD

Scott L. Lundahl, Moraga, Calif., assignor to Phototherapeutic Systems, Martinez, Calif.

Continuation-in-part of Ser. No. 227,751, Aug. 3, 1988, abandoned. This application Aug. 4, 1989, Ser. No. 374,664

Int. Cl.[5] A61B *17/36*

U.S. Cl. 606—15 **19 Claims**

1. A method for the uniform irradiation of the inner wall of a hollow cavity, including the steps of:

(a) providing a catheter having a deflated translucent balloon, the balloon having a wall;

(b) inserting the catheter into the interior of the cavity;

(c) inflating the balloon until the balloon wall forms a gener-

ally spherical balloon configuration and distends at least one portion of an inner wall of the cavity to be irradiated into a contiguous and congruent generally spherical cavity configuration;

(d) inserting a light transmission fiber having a light diffuser tip into the catheter so that the tip is positioned at a center

of the inflated balloon and, hence, automatically positioned at a uniform distance from the at least one portion of the cavity wall to be irradiated; and

(e) transmitting light through the transmission fiber out the tip

(e-1) whereby light of uniform intensity irradiates the at least one portion of the cavity wall.

4,998,931

METHOD OF REDUCING IMMUNOGENICITY AND INDUCING IMMUNOLOGIC TOLERANCE

Sherrill J. Slichter, Vashon Island, and H. Joachim Deeg, Seattle, both of Wash., assignors to Puget Sound Blood Center and Fred Hutchinson Cancer Research Center, both of Seattle, Wash.

Continuation of Ser. No. 58,599, Jun. 3, 1987, abandoned, which is a continuation of Ser. No. 752,452, Jul. 5, 1985, abandoned. This application Dec. 21, 1988, Ser. No. 290,856

Int. Cl.[5] A61N *1/30;* **A61F** *2/04*

U.S. Cl. 604—20 **13 Claims**

1. A method of reducing the immunogenicity of blood or blood products in vitro, comprising:

exposing the blood or blood products to a source of UV irradiation sufficient to reduce the immunogenicity of the blood or blood products without substantially interfering with the viability or physiological function of the blood or blood products.

4,998,932

CATHETER WITH DISTALLY LOCATED INTEGRATED CIRCUIT RADIATION GENERATOR

Arye Rosen, and Har'el Rosen, both of Cherry Hill, N.J., assignors to AMT Inc., Wilmington, Del.

Filed May 3, 1989, Ser. No. 346,873

Int. Cl.[5] A61B *17/36*

U.S. Cl. 606—29 **16 Claims**

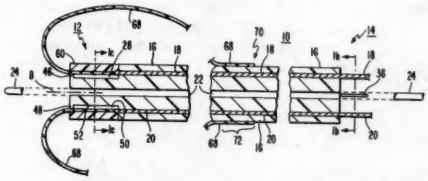
1. A catheter, comprising:

a semiconductor oscillator including first and second electrodes adapted for the application of energizing voltage thereto for generating electromagnetic radiation in response to application of said energizing voltage;

an elongated electrically insulating piece defining proximal and distal ends, said distal end being adapted to be introduced into a vas;

first and second elongated electrical conductive means electrically isolated by at least said elongated electrically insulating piece, said first and second elongated electrically conductive means each defining proximal and distal ends;

first electrical connecting means coupled to said first electrode of said semiconductor oscillator and to said distal end of said first elongated conductive means for providing electrical continuity therebetween;



second electrical connecting means coupled to said second electrode of said semiconductor radiation emitter and to said distal end of said second elongated conductive means for providing electrical continuity therebetween; and

mechanical connecting means coupled to said oscillator and to said electrically insulating piece for mechanical coupling thereof to form an assemblage which is adapted to be introduced into a vas.

4,998,933

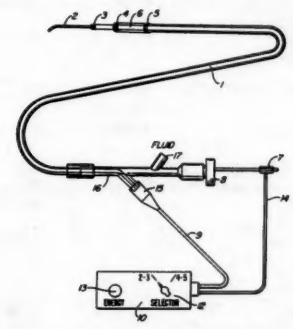
THERMAL ANGIOPLASTY CATHETER AND METHOD

Philip E. Eggers, San Francisco, and Hira V. Thapliyal, Mountain View, both of Calif., assignors to Advanced Angioplasty Products, Inc., Mountain View, Calif.

Filed Jun. 10, 1988, Ser. No. 204,668

Int. Cl.[5] A61B *17/36*

U.S. Cl. 606—41 **6 Claims**



1. In an angioplasty catheter having a dilation means, the improvement comprising:

a first electrode located on an extensible guidewire;

second electrode located at a distal end of said catheter electrically insulated from said first electrode;

a third electrode located at a distal end of said dilation means electrically insulated from said first and second electrodes;

a fourth electrode located at a proximal end of said dilation means electrically insulated from said first, second, and third electrodes;

whereby said guidewire comprises said first electrode;

whereby said second, third, and fourth electrodes are annular metallic regions having a wire extending therefrom;

means for selectively communicating an electric current to said electrodes to thereby cause heating of a resistive mass located between said electrodes;

whereby said means for communicating an electric current to said second, third, and fourth electrodes comprises at least one wire contained within the catheter; and

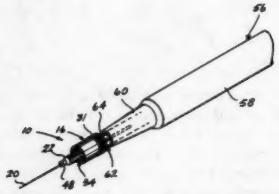
whereby said guidewire comprises said means for communicating an electric current to said first electrode.

4,998,934

NEEDLE ADAPTOR FOR AN ELECTROSURGICAL TOOL

Gerald Bernstein, 6653 NE. Windermere Rd., Seattle, Wash. 98115

Filed Aug. 21, 1989, Ser. No. 397,160
Int. Cl.[5] A61B *17/36*
U.S. Cl. 606—44 12 Claims



1. A needle adaptor for coupling a metal needle to an electrosurgical tool, the metal needle having a metal hub with a flange formed at the end thereof and an internal axial bore formed therein, the electrosurgical tool having a receiving end into which surgical tips are inserted, the adaptor comprising:

a stem formed of electrically conductive material, said stem being sized and shaped to be slidably received within the receiving end of the electrosurgical tool;

a post formed of electrically conductive material and in electrical contact with said stem, said post being sized and shaped to be inserted in the bore of the hub of the needle; and

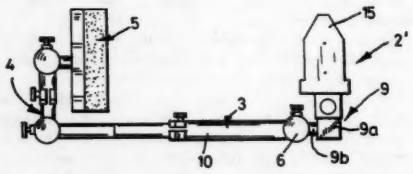
a collar associated with said post, said collar having a cylindrical wall and means for holding the needle hub onto said post.

4,998,935

FOOT SUPPORTING EXTENSION FOR EXTERNAL FIXATION UNITS

Dietmar Pennig, Laukamp 11, D-4400 Münster, Fed. Rep. of Germany

Filed Aug. 3, 1990, Ser. No. 562,479
Claims priority, application Fed. Rep. of Germany, Aug. 16, 1989, 3926893
Int. Cl.[5] A61F *5/04, 3/00*
U.S. Cl. 606—54 14 Claims



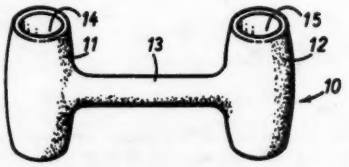
1. A supporting and orienting device for the ankle and the foot of a leg wherein the tibia carries an external osteosynthetic fixation unit, comprising a coupling member connectable to the fixation unit; an elongated variable-length carrier having a first end adjacent and a second end remote from said coupling member, said carrier being arranged to extend along the ankle of the leg wherein the tibia carries a fixation unit; a first joint having means for articulately connecting said first end with said coupling member; a brace arranged to abut the sole of the foot of a leg wherein the tibia carries a fixation unit; a link between said brace and said second end; a second joint having means for articulately connecting said second end with said link; and a third joint having means for articulately connecting said link with said brace.

4,998,936

APPARATUS FOR USE IN THE TREATMENT OF SPINAL DISORDERS

Seyed M. H. Mehdian, Robert Jones & Agnes Hunt Orthopaedic Hospital, Department of Spinal Disorders, Oswestry, Shropshire, SY10 7AG, England

Filed Jul. 29, 1988, Ser. No. 225,767
Claims priority, application United Kingdom, Aug. 7, 1987, 8718708
Int. Cl.[5] A61F *5/01*
U.S. Cl. 606—61 26 Claims



1. A crosspiece for use in forming a link or frame adapted to embrace a group of segments of a spinal column in the treatment of spinal disorders, said crosspiece comprising:

a pair of spaced apart tubular side members; and

a spacing member joining said side members to one another, said side members having longitudinal axes, said longitudinal axes being substantially parallel to one another,

said spacing member being disposed intermediate the ends of said side members and extending substantially at right angles to said side members and being substantially coplanar with said side members to form an H-shaped structure,

each of said side members having an axial bore which is open at least one end to receive a rod member,

the bores of said side members being open at the same ends of the side members.

4,998,937

METHOD OF IMPLANTING EXTRAMEDULLARY FEMORAL HEAD-NECK PROSTHESIS

James B. Grimes, 1921 18th St., Bakersfield, Calif. 93301

Continuation-in-part of Ser. No. 266,700, Nov. 3, 1988, abandoned. This application Dec. 20, 1989, Ser. No. 453,689
Int. Cl.[5] A61F *5/04, 2/30*
U.S. Cl. 606—89 12 Claims

1. A method of implanting an extramedullary femoral head-

neck prosthesis in a femur, the latter having a shaft and a neck at the upper end of the shaft at the medial side of the femur, comprising:

determining the axis of the medial trabecular stream of the femur;

cutting the neck of the femur to form a seat on the femur neck;

drilling a bore through the shaft of the femur to extend from the neck of the femur down to the lateral side of the shaft along a line substantially parallel to the axis of the medial trabecular stream;

inserting a barrel having an open end into said bore with the open end of the barrel facing upwardly;

securing said barrel in fixed position in the bore; and

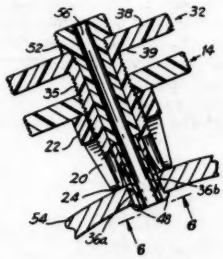
inserting a stem of a ball assembly coaxially into said barrel to bring a surface of the ball assembly into congruent, face-to-face engagement with said seat on the femur neck.

4,998,938

REMOVABLE SKULL MOUNTED WORK PLATFORM AND METHOD OF ASSEMBLING SAME

Jamshid B. G. Ghajar; Fathali G. Ghadjar, and Robert J. Hariri, all of New York, N.Y., assignors to Neurodynamics, Inc., New York, N.Y.

Filed Jun. 9, 1988, Ser. No. 204,451
Int. Cl.[5] A61B *19/00*
U.S. Cl. 606—130 **46 Claims**



1. A device for facilitating the insertion of an instrument into the cranium of a patient through an aperture previously formed in said cranium, without causing undue injury to underlying tissue therein, said device comprising:

a. guide means disposed in said aperture for directing said instrument through said aperture, said guide means comprising

i. an elongated open tubular member having a first end and a second end, said member defining a lumen extending from said first end to said second end, wherein at least a portion of said member at said first end is configured for passage through said aperture and into an inner portion of said cranium;

ii. means formed integral with said open tubular body member, at said first end thereof, for stabilizing said guide means within said aperture in said cranium; and

iii. a body portion having first and second parallel opposed sides, said first side of said body portion formed integral with said elongated open tubular member at said second end thereof, said body portion defining a lumen extending therethrough from said first side to said second side, in alignment with and adjacent to said lumen in said tubular member, to form, in combination therewith, an uninterrupted bore through said guide means;

b. adjustable means for locking said guide means against said cranium, said locking means defining an aperture therethrough, and configured and adapted for engaging said outer surface portion of said tubular member; and

c. a base member for aligning said guide means within said aperture in said cranium, said base member having an annular body portion with first and second opposed sides and a plurality of leg members extending substantially perpendicularly from said first side thereof, said leg members formed integral with said body portion, said base member being configured for the passage therethrough of at least a portion of said guide means,

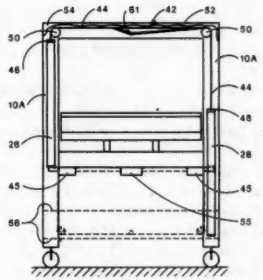
wherein instruments inserted through said device enter the interior of the cranium at an angle of substantially 20° to a plane tangent to the cranium at the aperture.

4,998,939

HOSPITAL BED WITH GUARD RAIL ACTUATED SAFETY APPARATUS

James W. Potthast, Chicago, and Thomas J. Ring, Harvey, both of Ill., assignors to R & P Joint Venture, Chicago, Ill.

Filed Sep. 28, 1988, Ser. No. 250,306
Int. Cl.[5] A47C *21/08*
U.S. Cl. 5—424 **75 Claims**



1. In a hospital bed having a frame, a patient support assembly mounted to the frame, a pair of left and right guard rails on opposite left and right sides of the patient support assembly and means for mounting the guard rails to the frame for movement between relatively inoperative and operative positions in which they are relatively less and more effective to restrain the patient against lateral movement off the side of the patient support assembly directly associated therewith, the improvement being a guard rail actuated safety apparatus, comprising:

means directly associated with the left guard rail for preventing movement of the left guard rail to a relatively inoperative position when the opposite right guard rail is in a relatively inoperative position; and

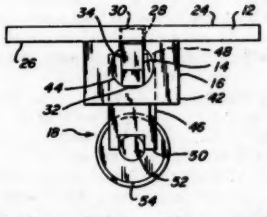
means directly associated with the right guard rail for preventing movement of the right guard rail to a relatively inoperative position when the left guard rail is in a relatively inoperative position.

4,998,940

ROTATABLE ROLLER AND METHOD OF USE

Linn V. Norman, 1505 N. Royer, Colorado Springs, Colo. 80907

Filed Oct. 3, 1989, Ser. No. 416,461
Int. Cl.[5] B60B *33/06*
U.S. Cl. 16—34 **13 Claims**



1. A device to be attached to an object to permit that object

to be moved across a surface or to remain stationery on that surface, comprising:

(a.) a rigid plate having an upper face and a lower face, adapted to allow the upper face to be held in contact with the object to be moved, having a slot formed in the lower face,

(b.) a bar having a plate edge and a roller edge, and having two ends, said plate edge being adapted to permit the plate edge to be received into the slot of the rigid plate, in such a manner that the bar is held perpendicular to the rigid plate when the plate edge is located in the slot of the rigid plate,

(c.) holding means for holding the bar, which holding means is connected to the rigid plate and holds the bar in proximity to the lower face of the rigid plate, which holding means permits the bar to be moved from a position in which the plate edge is located in the slot of the rigid plate, to a position in which the bar is parallel to the rigid plate, and

(d.) roller means attached to the roller edge of the bar.

12. A method of moving an object across a surface, comprising the steps of:

(a.) attaching to the object a device comprising a rigid plate having an upper face and a lower face, adapted to allow the upper face to be held in contact with the object to be moved, having a slot formed in the lower face; a bar having a plate edge and a roller edge, and having two ends, said plate edge being adapted to permit the plate edge to be received into the slot of the rigid plate, in such a manner that the bar is held perpendicular to the rigid plate when the plate edge is located in the slot of the rigid plate; a holding means for holding the bar, which holding means is connected to the rigid plate and holds the bar in proximity to the lower face of the rigid plate, which holding means permits the bar to be moved from a position in which the bar is parallel to the rigid plate to a position in which the bar is perpendicular to the rigid plate; and a roller means attached to the roller edge of the bar,

(b.) lifting the object to allow the bar to drop into the position in which the bar is perpendicular to the rigid plate,

(c.) lowering the object to allow the plate edge of the rigid plate to be received by the slot of the rigid plate, causing the roller means to be held in contact with the surface, and

(d.) pushing the object.

13. A method of placing an object into a stationery position with respect to a surface on which the object is located, comprising the steps of:

(a.) attaching to the object a device comprising a rigid plate having an upper face and a lower face, adapted to allow the upper face to be held in contact with the object, having a slot formed in the lower face; a bar having a plate edge and a roller edge, and having two ends, said plate edge being adapted to permit the plate edge to be received into the slot of the rigid plate, in such a manner that the bar is held perpendicular to the rigid plate when the plate edge is located in the slot of the rigid plate; a holding means for holding the bar, which holding means is connected to the rigid plate and holds the bar in proximity to the lower face of the rigid plate, which holding means permits the bar to be moved from a position in which the bar is parallel to the rigid plate to a position in which the bar is perpendicular to the rigid plate; and a roller means attached to the roller edge of the bar,

(b.) lifting the object to allow the bar to drop so that the plate edge is not located within the slot,

(c.) causing the bar to rotate to a stationery position in which the bar is parallel to the plate, and

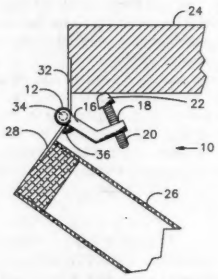
(d.) lowering the object adjacent to the surface, while the bar is in the stationery position in which the bar is parallel to the plate.

4,998,941

ADJUSTABLE DOOR STOP

B. Jack Smith, 8633 E. 79th St., Tulsa, Okla. 74133

Filed Mar. 19, 1990, Ser. No. 495,435
Int. Cl.[5] E05D *11/06*
U.S. Cl. 16—375 **4 Claims**



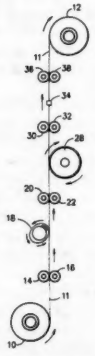
1. An adjustable door stop for a hinge mounted door having at least one hinge leaf connected to said door, at least one hinge leaf connected to a doorway, and a hinge pin, which door stop comprises: a body having means to receive said hinge pin therethrough so that said body may rotate substantially perpendicular to the axis of said hinge pin; adjustable means extending from said body to rest against said doorway; and a finger extending from said body adjacent to said means to receive said hinge pin, said finger substantially parallel to the axis of said hinge pin so that upon opening of said door, said finger will contact and rest upon said hinge leaf connected to said door, arrest movement of said hinge leaf, and thereby stop movement of said door without said door stop contacting said door.

4,998,942

SNUBBER PROFILE

Charles F. Reinholtz, Blacksburg, Va., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Dec. 27, 1989, Ser. No. 457,850
Int. Cl.[5] D02J *1/22*
U.S. Cl. 28—245 **5 Claims**

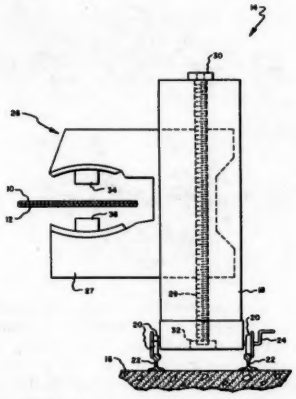


3. A rigid, non-flexible snubber device to provide drag to a material being transported thereover comprising; a snubber having an external surface, said external surface being in the shape of a logarithmic spiral.

4,998,943
METHOD OF INSERTING FASTENERS

Bradley M. Roberts, Williamsville, and James L. Birke, North Tonawanda, both of N.Y., assignors to Gemcor Engineering Corporation, Buffalo, N.Y.

Filed Feb. 22, 1989, Ser. No. 314,415
Int. Cl.[5] B21D *39/03*
U.S. Cl. 29—432.2 **9 Claims**



1. A method of inserting a fastener into side-by-side upper and lower workpieces, the method comprising the following steps:

providing tooling including an upper ram, and upper and lower opposed spaced apart clamps moveable towards and away from said upper and lower workpieces;

moving the upper clamp downwardly into contact with the top surface of the upper workpiece;

moving the lower clamp upwardly into contact with the bottom surface of the lower workpiece;

positioning a fastener below the upper ram and above the top surface of the upper workpiece;

moving the upper ram to a lowered position to force the fastener into the workpieces;

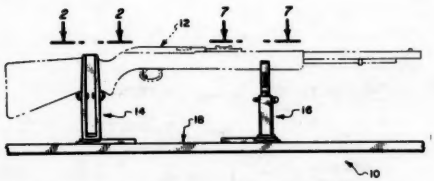
vibrating the upper ram while it is maintained in engagement with the fastener to fully insert the fastener and to relieve any stresses which may be present; and

moving the upper ram and the upper and lower clamps away from the workpieces.

4,998,944
REMOVABLE, ADJUSTABLE GUN SUPPORT

Richard B. Lund, 28416 Pacheco, Mission Viejo, Calif. 92692

Filed Nov. 13, 1989, Ser. No. 434,726
Int. Cl.[5] F41A *23/18*
U.S. Cl. 42—94 **3 Claims**



1. In a mechanism for supporting objects, the combination of:

(a) a support surface;

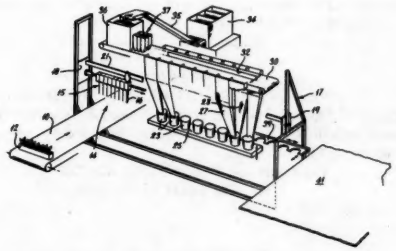
(b) a rear supporting means releasable attached to said support surface, and comprising a relatively stationary jaw and a movable jaw which is pivotably mounted at a mid-section of the stationary jaw; each of said jaws including an upper object engaging portion and a lower portion; and a torsion spring mounted on the rear supporting means such that the lower jaw portions are forced apart from each other while the upper engaging portions are forced towards each other; and

(c) a front vertically adjustable supporting means releasably attached to said support surface and comprising a stationary V-shaped member having an upper object engaging portion.

4,998,945
TRANSPLANTING EQUIPMENT

John B. Holt, Bedford; Simon J. Miles, Barton-Le-Clay, and Arthur L. Wilkin, Hitchin, all of England, assignors to National Research Development Corporation, London, England

Filed Dec. 7, 1989, Ser. No. 446,562
Claims priority, application United Kingdom, Dec. 14, 1988, 8829168; Jul. 7, 1989, 3915606
Int. Cl.[5] A01G *9/00*
U.S. Cl. 47—1.01 **12 Claims**



1. Transplanting equipment comprising;

a line of individual plant pick-up devices,

first support means for transversely moving a first row of containers into vertical alignment with said plant pick-up devices,

control means for bringing said plant pick-up devices into one of a plant supporting and plant-releasing mode,

horizontal drive means operative to bring said plant pick-up devices into vertical alignment with containers of a second row having a different centre-to-centre spacing than said containers of said first row,

second support means for transversely moving said second row of containers out of vertical alignment with said plant pick-up devices, and

vertical drive means for moving said plant pick-up devices towards and away from said first and second support means to allow support and release of plants by said plant pick-up devices as determined by said control means.

4,998,946
WEATHER STRIP FOR MOTOR VEHICLE

Masahiro Nozaki, Miwa, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan

Filed May 29, 1990, Ser. No. 529,550
Claims priority, application Japan, Aug. 18, 1989, 1-97063
Int. Cl.[5] E06B *7/16*
U.S. Cl. 49—497 **6 Claims**

1. A weather strip made of rubber or synthetic resin, which is to be attached along one of a door opening of a body of a motor vehicle and a periphery of a door for closing the door opening, comprising:

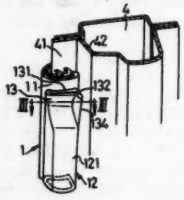
a base portion;

a tubular sealing portion projecting from an outer surface of said base portion;

said tubular sealing portion having a folded end portion

which is formed by pressing so as to close an end of said tubular sealing portion;

said folded end portion having a nearly L-shaped cross section, and is composed of a bonded portion which covers said outer surface of said base portion, and an extension portion which nearly perpendicularly extends from one of



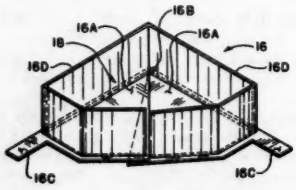
widthwise ends of said bonded portion along one of the body of the motor vehicle and a panel of the door, said extension portion extends away from the base portion, a side surface of said extension portion being a prolongation of a side surface of said tubular sealing portion, which is opposed to one of the body of the motor vehicle and the panel of the door.

4,998,947

CORNER CAP STRUCTURE AND METHOD

Gregory W. Dostall, Mt. Laurel, and Thomas J. Saloom, Plainsboro, both of N.J., assignors to Alcan Aluminum Corporation, Cleveland, Ohio

Filed Nov. 14, 1989, Ser. No. 436,214
Int. Cl.[5] E04H *12/00*
U.S. Cl. 52—300 **20 Claims**



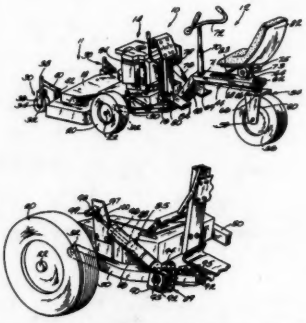
1. A corner cap for attachment to an end of a corner post of a building to cover the end of the corner post, the end of the corner post having a configuration determined by a corner angle of the corner post, said corner post defining a longitudinally extending channel the configuration of which is related to the configuration of the corner cap, said corner cap being adapted to be attached to the end of the corner post, said corner cap comprising sections which are movable relative to each other to adjust the configuration of the corner cap to form a substantially complete cover for the end of a corner post whose configuration is within a predetermined range, said corner cap sections defining a corner angle which is angularly adjustable as said sections move relative to each other to adjust the configuration of said corner cap, each of said sections defining a respective portion of a base for covering an end of the channel defined by the corner post, said portions of said base being substantially planar and angularly movable relative to each other over a predetermined angular range, said portions of the base varying over said predetermined angular range from an orientation in which said portions of the base are substantially co-planar to an orientation in which said portions of the base are overlapped to a predetermined extent, thereby to enable the corner cap to be formed into a substantially complete cover for the end of the channel of the corner post whose configuration is within the predetermined range.

4,998,948

LAWN MOWER

Lloyd A. Osterling, Bradenton, Fla., assignor to Scag Power Equipment, Inc., Mayville, Wis.

Filed Dec. 4, 1989, Ser. No. 445,976
Int. Cl.[5] A01D *34/68*
U.S. Cl. 56—12.6 **15 Claims**



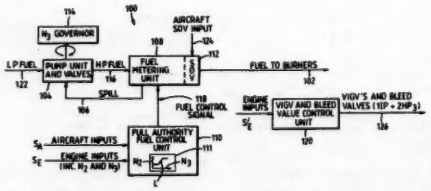
12. A lawn mower comprising a riding unit and a power and cutting unit, first wheel means mounted for rotation on the power and cutting unit, said riding unit including frame means coupled to said power and cutting unit for pivotal movement about a pivot axis, second wheel means rotatably mounted on said frame means, said power and cutting unit including a cutting assembly and a drive assembly having engine means coupled to the cutting assembly, said engine means also being coupled to said first wheel means for driving said mower in a first direction generally perpendicular to the pivot axis as said mower is displaced, and shock absorbing means coupled at one end to said frame means and at its other end to said power and cutting unit, said shock absorbing means having a line of action which intersects a plane containing the direction of movement of the mower and said pivot axis, said dampening means being operative to dampen relative pivotal movement of said power and cutting unit relative to said riding unit whereby the tendency of said cutting unit to bounce is reduced so that an acceptable cut can be obtained at cutting speeds in excess of those possible without said shock absorbing means.

4,998,949

OVERSPEED LIMITER FOR GAS TURBINE AEROENGINE

Hugh F. Cantwell, Derby, England, assignor to Rolls-Royce Plc, London, England

Filed Dec. 12, 1988, Ser. No. 282,557
Claims priority, application United Kingdom, Dec. 24, 1987, 8730187
Int. Cl.[5] F02C *9/28*
U.S. Cl. 60—39.161 **7 Claims**



1. A fuel control system for a gas turbine aeroengine having at least one spool, the engine having a normal working characteristic defined by the normal working relationship between the rotational speed of the spool and at least one other internal

working parameter of the engine, the fuel control system including:

controller means for receiving engine control commands form a flight station and sensor signals from sensors in the engine, the sensor signals representing working parameters of the engine, the controller means incorporating predetermined control laws for acting upon the control commands and sensor signals to produce a fuel control signal;

fuel metering means for receiving the fuel control signal and controlling fuel flow to the engine in accordance therewith; and

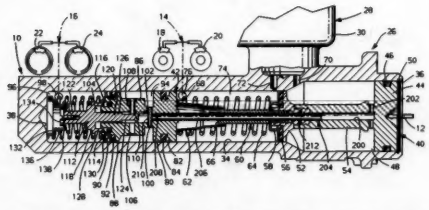
overspeed limiter means comprising means for defining a variable speed limit for the spool as a function of said at least one other internal working parameter, which speed limit varies in correlation with said normal working characteristic up to a predetermined maximum acceptable limit of spool speed in a manner which avoids interference with normal operation of the engine, and means for overriding the effect of the fuel control signal on fuel flow such that fuel flow to the engine is trimmed whenever the spool speed exceeds the variable speed limit, thereby to avoid substantial overshooting of the predetermined maximum acceptable limit of spool speed; said gas turbine aeroengine having at least a high pressure spool and a relatively lower pressure spool, said normal working characteristic being defined by the normal working relationship between the rotational speed of said lower pressure spool and said at least one other internal working parameter of the engine, said variable speed limit being defined for said lower pressure spool.

4,998,950

CENTER COMPENSATING MASTER CYLINDER

Dennis D. Derrick, Xenia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 2, 1990, Ser. No. 474,575
Int. Cl.[5] B60T *11/20*
U.S. Cl. 60—562 **5 Claims**



1. In a master cylinder assembly having a master cylinder body with a bore therein, a brake fluid reservoir, a primary pressurizing piston and a secondary pressurizing piston each having a front face and a rear face, a primary pressurizing chamber defined by the wall of said bore and said front face of said primary pressurizing piston and said rear face of said secondary pressurizing piston, said primary pressurizing chamber being adapted to be connected to a first brake circuit for brake actuation and release, a secondary pressurizing chamber defined by the wall of said bore and said secondary pressurizing piston front face, said secondary pressurizing chamber being adapted to be connected to a second brake circuit for brake actuation and release, a primary and a secondary piston return spring pre-loaded in compression and respectively acting on said primary and secondary pressurizing pistons to continually urge said pistons to the master cylinder fully released position, a center compensation valve member having a forwardly extending pin part and a rearwardly extending pin part, said rearwardly extending pin part having a reduced diameter portion, said secondary pressurizing piston having a bore therein receiving said rearwardly extending pin part of said center compensation valve member, the wall of said secondary pressurizing piston bore and said center compensation valve member rearwardly extending pin part defining an annular space formed there between, said secondary pressurizing piston having a valve seat thereon selectively engageable by and disengageable from said valve member to open and close fluid connection between said secondary piston bore and said secondary pressurizing chamber, and an inner secondary spring located in said secondary pressurizing chamber and acting on said valve member to close said fluid connection upon forward movement of said secondary pressurizing piston from its released position; the improvement comprising:

a tube having a passage therethrough and one tube end affixed to said secondary pressurizing piston and forming a rearward continuation of said secondary pressurizing piston bore;

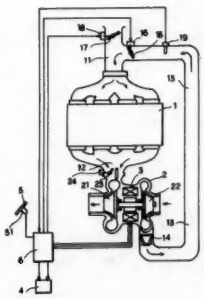
said primary pressurizing piston having a bore therein in axial alignment with said secondary pressurizing piston bore and said tube and slidably receiving said tube therein, and a passage in said primary pressurizing piston operatively maintaining fluid compensation connection of said primary pressurizing piston bore and said tube passage with said brake fluid reservoir.

4,998,951

TURBOCHARGER CONTROL SYSTEM

Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Ceramics Research Institute Co., Ltd., Fujisawa, Japan

Filed Aug. 7, 1989, Ser. No. 390,222
Claims priority, application Japan, Aug. 5, 1988, 63-195719
Int. Cl.[5] F02B *37/14;* **F02D** *23/00*
U.S. Cl. 60—608 **8 Claims**



1. A system for controlling a turbocharger associated with an internal combustion engine, comprising:

a passage interconnecting an air outlet of the turbocharger and an air inlet of the engine;

opening and closing means, disposed in an end of the passage which is connected to said air inlet, for selectively opening and closing said end of the passage;

detecting means for detecting the amount of depression of an accelerator pedal which controls the output power of the engine; and

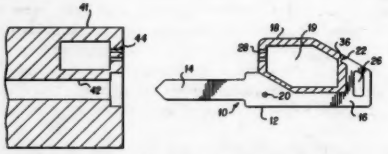
control means for controlling said opening and closing means to close said passage end to store intake air in said passage, when the amount of depression of said accelerator pedal is reduced at a speed higher than a predetermined speed as detected by a signal from said detecting means, and for controlling said opening and closing means to open said passage end to release the stored intake air and supply the stored intake air to the engine, when the amount of depression of said accelerator pedal is increased.

4,998,952

KEY FOR ELECTRONIC AND MECHANICAL LOCKS

Richard G. Hyatt, Jr., and Charles E. Hall, both of Salem, Va., assignors to Medeco Security Locks, Inc., Salem, Va.

Filed Mar. 2, 1990, Ser. No. 487,109
Int. Cl.[5] E05B *19/04*
U.S. Cl. 70—395 7 Claims



1. A key for both electronic and mechanical locks, the key having a key bow, a key blade integral with and extending from the key bow, the key blade having a capability of being configured to operate a mechanical lock, and an electronic circuit means carried by the key bow for operating an electronically activated lock, with improvements comprising;

a completely separate and removable housing containing the electronic circuit means,

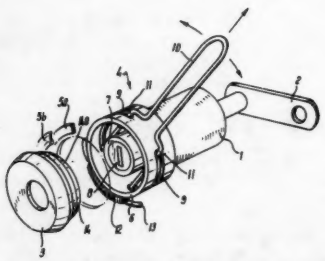
means for securing such housing to the key bow to allow removal of such housing to separate the housing and thereby allowing such circuit to be placed on another key.

4,998,953

LOCK WITH AN EXTERNALLY MOUNTABLE ESCUTCHEON

Clive J. Wilkin, Crewe, England, assignor to Rolls-Royce Motor Cars Limited, Cheshire, England

Filed Oct. 10, 1989, Ser. No. 419,261
Claims priority, application United Kingdom, Oct. 14, 1988, 8824123
Int. Cl.[5] E05B *15/02*
U.S. Cl. 70—452 12 Claims



1. A lock assembly comprising a lock mechanism, an escutcheon adapted to be releasably fixed to the mechanism and a member operative to releasably fix the escutcheon to the mechanism, the escutcheon and mechanism being formed such that the escutcheon can be pushed onto the mechanism to achieve the releasable fixing.

4,998,954

ISOKINETIC PROBE AND PRESSURE REDUCTION ASSEMBLY

William J. Burr, Newfane, N.Y., assignor to Union Carbide Industrial Gases Technology Corporation, Danbury, Conn.

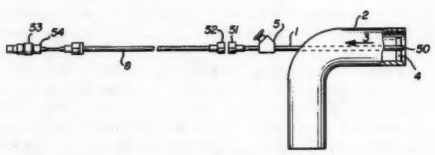
Filed Jan. 19, 1990, Ser. No. 467,568
Int. Cl.[5] G01N *1/00*
U.S. Cl. 73—863.58 10 Claims

1. An isokinetic probe and pressure reduction assembly comprising:

(A) a probe guide tube having input and output ends, said probe guide tube being insertable within and in-line with a gas flow line;

(B) an isolation valve on the probe guide tube between the input and output ends of the probe guide tube;

(C) a support guide tube having input and output ends, the input end of the support guide tube being matable with the output end of the probe guide tube;



(D) a moveable isokinetic probe having input and output ends, capable of movement within the support guide tube and the probe guide tube; and

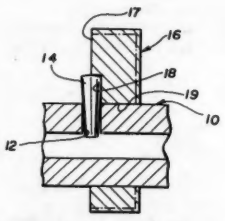
(E) a converging-diverging nozzle assembly matable with the output end of the isokinetic probe for flow communication with the isokinetic probe.

4,998,955

ASSEMBLED CAMSHAFT

Takeshi Hiraoka, Saitama; Shunsuke Takeguchi, Tochigi, and Satoshi Kawai, Kuki, all of Japan, assignors to Nippon Piston Ring Co., Ltd., Tokyo, Japan

Filed May 10, 1989, Ser. No. 349,773
Claims priority, application Japan, May 23, 1988, 63-123799
Int. Cl.[5] F16H *53/00;* B25G *3/20*
U.S. Cl. 74—567 4 Claims



1. An assembled camshaft comprising

a steel shaft, and

at least one cam piece made from a sintering iron-base alloy material and secured at predetermined positions to said shaft by sintering,

said cam piece being formed on the side surface thereof with a pin-receiving groove in which a steel positioning pin is fitted prior to being sintered and set on the outer surface of said shaft,

said pin containing no more than 0.25% by weight of carbon,

said shaft containing 0.45 to 0.55% by weight of carbon, and said cam piece containing 1.5 to 4.0% by weight of carbon.

4,998,956

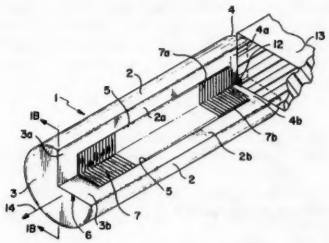
SKI AND SNOWBOARD SHARPENER

Frederick R. Sherman, 525 Willard, Pocatello, Id. 83201

Filed Jun. 27, 1990, Ser. No. 544,634
Int. Cl.[5] B21K *17/00;* B23D *67/12*
U.S. Cl. 76—83 7 Claims

1. A sharpener for sharpening the vertical and horizontal metallic edge surfaces of a ski or snowboard edge comprising an elongated housing having a side wall and end walls, an axially extending quadrant opening provided in said side wall and end walls, an axially extending recess in said housing in said quadrant opening and communicating with the quadrant

opening, the portions of the side wall and end walls adjacent the quadrant opening providing vertical and horizontal guiding surfaces in the quadrant opening for the ski edge, and a file mounted in said recess, said file having vertically and horizontally disposed teeth portions, the teeth portions on one end of the file extending no further than the vertical and horizontal



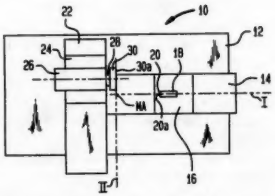
guiding surfaces at said one end of the file, the teeth portions toward the opposite end of the file extending progressively further outwardly from the adjacent vertical and horizontal guiding surfaces, whereby the vertical and horizontal surfaces at said one end of the file guide the sharpener on the edge to be sharpened, while the progressively protruding teeth toward the opposite end of the file engage the edge to be sharpened.

4,998,957

DEVICE FOR MINIMIZING THE THERMAL SENSITIVITY OF A MACHINING APPARATUS

David H. Youden, Nelson, N.H., assignor to Rank Taylor Hobson Inc., Keene, N.H.

Filed Apr. 3, 1989, Ser. No. 336,743
Int. Cl.[5] B23B *3/00*
U.S. Cl. 82—117 **78 Claims**



1. A machining device for the precision machining of a workpiece, said machining device comprising:

(a.) a base;

(b.) a slide support on said base;

(c.) a first slide on said base, said first slide being adapted to move a cutting tool along a first longitudinal axis;

(d.) a second slide on said slide support, said second slide being adapted to move a workpiece having a workface in a direction transverse to said first longitudinal axis, said first slide and said second slide being movable relative to one another so that the cutting tool contacts the workface of the workpiece;

(e.) a measurement axis defined by the intersection of a first imaginary plane passing through said first longitudinal axis and a second imaginary plane which includes the workface of the workpiece;

(f.) a temperature-insensitive member having a first end and a second end and being disposed in said second imaginary plane, said first end being connected to said base and disposed in said measurement axis, said temperature-insensitive member being so constructed that it maintains a substantially constant length during operation of the machining device even when the temperature in and around the machining device fluctuates; and

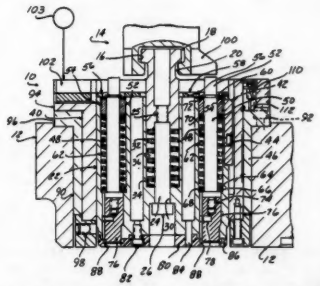
(g.) an alignment mechanism connected to said second end of said temperature-insensitive member and connected to said slide support, said alignment mechanism having a fixed point in an imaginary alignment plane extending from and including said second end of said temperature-insensitive member, said alignment mechanism being so constructed and arranged with respect to said temperature-insensitive member and said slide support that said fixed point remains stationary with respect to said measurement axis when the machining device or parts thereof expand or contract due to temperature variations.

4,998,958

MULTITOOL PUNCH HOLDER

Victor L. Chun, Holland, and James R. Hunter, Chadds Ford, both of Pa., assignors to Murata Wiedemann, Inc., King of Prussia, Pa.

Continuation of Ser. No. 355,252, May 22, 1989, abandoned.
This application Jul. 20, 1990, Ser. No. 555,375
Int. Cl.[5] B26F *1/08*
U.S. Cl. 83—133 **1 Claim**



1. A multitool punch holder (10) for a punch press having a rotary turret (12) formed with a series of tool receiving stations arrayed about the circumference of said rotary turret (12), said punch press also having a vertically reciprocal ram aligned with tooling at one of said turret stations, said punch holder including a tool carrier cylinder (22) having a longitudinal axis; means (40, 90) adapted to rotatably support said tool carrier cylinder (22) in said turret (12); indexing means (102, 103) for rotating said tool carrier cylinder (22) about said axis through a series of rotary indexed positions; said tool carrier cylinder (22) formed with an array of bores (48) distributed equidistantly about the axis of said tool carrier cylinder (22), each corresponding to one of said indexed positions, a punch (76) slidably mounted in each respective bore (48), each punch (76) having a stem rod (50) attached thereto having, a plunger end (52) protruding above said tool carrier cylinder (22); a drive member (20) having one end extending into said tool carrier cylinder (22) and an upper end (18) protruding thereabove, said upper end (18) configured with a tee shape to be adapted to be coupled with said ram (14) by passing into a tee slot (16) in said ram (14) as said rotary turret (12) rotates said tool carrier cylinder (22) to said one station; a spring (32) interposed between said drive member (20) and said tool carrier cylinder (22) enabling said ram (14) to drive said tool carrier cylinder (22) downward until said tool carrier cylinder (22) movement is arrested by engagement with workpiece and thereafter said spring (32) compressed to allow continued descending movement of said ram (14) with said tool carrier (22) stationary against said workpiece; said ram (14) having a drive feature (100) aligned with a punch stem rod end (52) in each indexed position of said tool carrier cylinder (22), said stem rod end (52) located so as to be first engaged by said ram drive feature (100) as said ram (14) descends past the point at which said tool carrier cylinder (22) movement is arrested, to thereafter cause said ram (14) to drive said punch (76) to punch said workpiece; a stripper spring (62) associated with each punch (76) resisting

said driving motion thereof in said bore (48) to urge retraction of said punch (76) after raising of said ram (14);

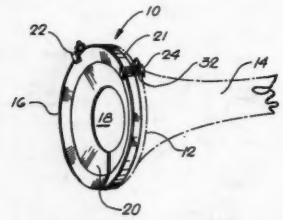
said means (40, 90) adapted to rotatably support said tool carrier cylinder (22) in said turret (12) including an axially fixed rotary sleeve (40) driven by said indexing means (102, 103); means (42) rotatably coupling said sleeve (40) to said tool carrier cylinder (22) while accomodating ralative axial movement therebetween; a series of radially extending spring urged plungers (98) mounted in said sleeve (40) and engaging the periphery of said tool carrier cylinder (22) to yieldably retain said tool carrier cylinder (22) in an elevated position in said sleeve (40) upon retraction of said ram (14) to its raised position.

4,998,959

MUTE FOR HORN-TYPE INSTRUMENTS

Thomas Purdie, 336 21st St., Room 132, Miami Beach, Fla. 33139

Filed Jul. 19, 1990, Ser. No. 555,113
Int. Cl.[5] G10D *9/06*
U.S. Cl. 84—400 **11 Claims**



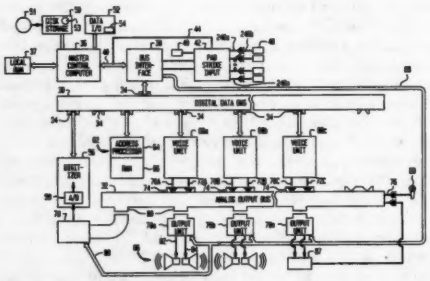
1. A mute for a horn-type musical instrument having a bell comprising a freely resonating body including an opening therein to permit air flow through said body, and a slit extending from said opening to facilitate resonance of said body, said body being adapted to fit over the outside of said bell on the bell wire to thereby change the timbre of the sound generated by said instrument and maintain the majority of the volume of said sound generated prior to placement of said mute onto said bell.

4,998,960

MUSIC SYNTHESIZER

Floyd D. Rose, 5303 154th Ave. SE., Bellevue, Wash. 98006; John C. Ragin, III, and Ronald H. Randall, Jr., both of Bellevue, Wash., assignors to Floyd Rose, Bellevue, Wash.

Filed Sep. 30, 1988, Ser. No. 252,568
Int. Cl.[5] G10H *7/00, 1/02*
U.S. Cl. 84—622 **51 Claims**



1. A synthesizer comprising:

(a) reproduction means for accepting input signals and producing, responsive to said input signals, output signals simulating sounds emitted by a vibratory element of a musical instrument so that each said output signal simulates the sound emitted by said vibratory element in response to one excitation thereof; and

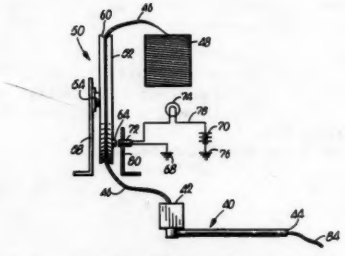
(b) overlap means operative when said input signals call for said reproduction means to produce overlapping output signals simulating overlapping sounds emitted by said vibratory element upon closely-spaced excitations thereof for altering at least one of said output signals to change the individual sound simulated by each said altered output signal and thereby simulate a change in sound produced by said vibratory element occasioned by said closely spaced excitations.

4,998,961

TWINE MONITORING ASSEMBLY FOR ROUND BALERS

J. Dale Anderson, Canton, and Lavern R. Goossen, Newton, both of Kans., assignors to Hay & Forage Industries, Hesston, Kans.

Continuation of Ser. No. 384,847, Jul. 17, 1989, abandoned, which is a continuation of Ser. No. 102,026, Sep. 29, 1987, abandoned. This application Feb. 28, 1990, Ser. No. 492,286
Int. Cl.[5] B67B *57/10*
U.S. Cl. 100—4 **9 Claims**



1. In a round baler having a baling chamber for spinning a cylindrical bale of fibrous crop material about its longitudinal axis during and after formation thereof, said baler including means for wrapping said bale with a strand of twine from a twine supply prior to discharge of said bale from said chamber, said wrapping means including a twine dispenser having a dispensing end movable along the longitudinal length of the bale for dispensing twine thereto by increments during each twine dispensing cycle, the improvement comprising a twine monitor assembly for monitoring the dispensing of said twine, said twine monitor assembly including:

an electrically powered indicator which is repeatedly actuatable during each dispensing cycle;

sensing means continuously monitoring the twine during each dispensing cycle for sensing each predetermined increment of twine being dispensed from the twine dispenser; and

indicator actuating means for repeatedly turning the indicator on and off during each dispensing cycle in response to the sensing means sensing dispensing of said predetermined increments of twine, the speed at which the indicator repeatedly turns on and off providing an indication that twine is being dispensed and of the speed at which the twine is being dispensed.

4,998,962

PRINTING METHOD AND PRINTED PRODUCT

Wallace Edwards, P.O. Box 1267, Station B, Weston, Ontario, Canada M9G 2R9

Filed Jan. 25, 1989, Ser. No. 302,539
Int. Cl.[5] B41M *1/14*
U.S. Cl. 101—211 **8 Claims**

1. A method of printing with at least two printing plates, or

their equivalent, characterized in that associated halftone dots, belonging to two distinct pluralities, each of which is printed with one of said two printing plates, and each of which are

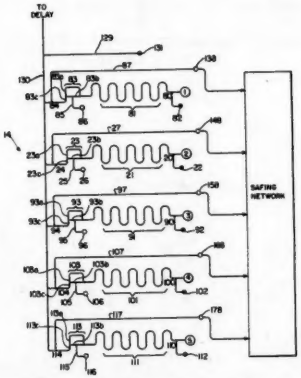
interleaved with the other and printed in a colour different from the other, are separated by a gap when printed in perfect register.

4,998,963

EXPLOSIVE LOGIC CLOCK

Denis A. Silvia, Aberdeen, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 23, 1981, Ser. No. 333,608
Int. Cl.[5] F42B *3/10, 15/00*; F42C *19/08*
U.S. Cl. 102—275.9 **14 Claims**



10. An explosive logic clock for propagating a plurality of detonation signals to a safing network, comprising:

a plurality of detonation means creating a plurality of detonation signals;

means opening a time window during which the plurality of detonation signals must occur; and

means validating the detonation signals.

4,998,964

COMPUTER CONTROLLED EMBROIDERY MACHINE FOR EMBROIDERING ON CURVED SURFACES AND ATTACHMENT THEREFOR

Kenneth R. Golia, North Haven, Conn., assignor to Ultramatic Embroidery Machine Company, North Haven, Conn.

Filed Mar. 16, 1990, Ser. No. 495,742
Int. Cl.[5] D05B *21/00*
U.S. Cl. 112—121.12 **19 Claims**

1. In an embroidery machine, the combination comprising:

(a) a machine base providing a bed and a head spaced thereabove with at least one needle reciprocatable therein relative to an aperture in said bed, said needle and aperture defining an embroidery station therebetween;

(b) an X-Y guidance system for moving an embroidery frame relative to said embroidery station and including a rail extending transversely of said base and embroidery station and providing drive means for moving an embroidery frame transversely of said station along an X-axis, said system including drive means for moving said rail perpendicularly to its longitudinal axis along a Y-axis;

(c) computer control means for operating said X-Y guidance system and said needle;

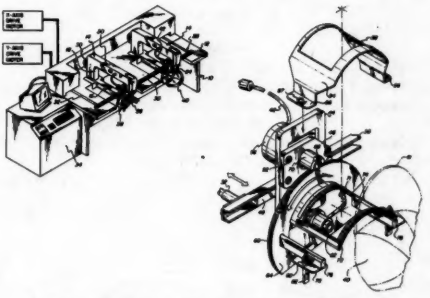
(d) a removable attachment for supporting and embroidering an article with a surface which is convexly arcuate in the direction of said X-axis, said attachment including;

(i) a support;

(ii) means releasably mounting said support on said transverse rail for movement therewith in said Y-axis;

(iii) an axis on said support having its axis extending in said Y-axis in alignment with said embroidery station and below said bed;

(iv) an arcuate frame element rotatably supported on said axle and having an aperture therein above and aligned with said embroidery station;



(v) drive means on said support for rotating said frame element in either direction of rotation and including a reversible motor operable independently of said drive means of said X-Y guidance system;

(vi) connector means releasably connecting said motor of said drive means of said attachment to said computer control; and

(vii) a clamping element releasably engaged with said frame element to releasably clamp a workpiece therebetween, whereby said computer control is operative to move said rail and thereby said frame along the Y-axis relative to said embroidery station and to operate said motor means of said attachment to rotate said frame element about said axis of rotation to embroider a workpiece in accordance with a preselected pattern.

4,998,965

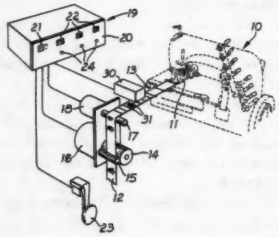
FEEDING DEVICE HAVING CONTROL MEANS, FEED ROLLERS, A PULSE GENERATOR AND A PHOTOELECTRIC DEVICE FOR DIRECTLY MEASURING RATE OF FEED OF AN ELASTIC STRIP HAVING MARKS THEREON FOR A SEWING MACHINE

Peter W. Easom, Bakery Cottage, New Road, Burton Lazars, Melton Mowbray, Leicestershire, LE14 2UU, United Kingdom

PCT No. PCT/GB88/00132, § 371 Date Oct. 13, 1989, § 102(e) Date Oct. 13, 1989, PCT Pub. No. WO88/09408, PCT Pub. Date Dec. 1, 1988
PCT Filed Feb. 25, 1988, Ser. No. 382,680
Claims priority, application United Kingdom, Feb. 26, 1987, 8704536
Int. Cl.[5] D05B *27/10, 35/06*
U.S. Cl. 112—305 **18 Claims**

1. A feeding device for feeding elastic strip material to a sewing machine comprises strip feeding means arranged to feed strip in response to at least one control signals, sensing

means arranged to directly sense the rate of feed of the strip and to generate at least one sensing signals and control means



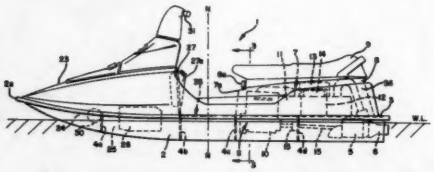
arranged to receive said sensing signals and generate control signals for controlling the strip feeding means.

4,998,966

SMALL WATERCRAFT

Yoshinori Yamaguchi, Moriguchi, Japan, assignor to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Jul. 14, 1989, Ser. No. 380,634
Claims priority, application Japan, Jul. 15, 1988, 63-177382
Int. Cl.[5] B63B *35/00*
U.S. Cl. 114—270 **3 Claims**



1. A watercraft comprising a hull having fore and aft portions, a water jet propulsion device mounted in said aft portion of the hull, a steering bar installed in the fore portion of the hull and connected to adjust said propulsion device, said hull being shaped such that the center of buoyancy is slightly aft of the center in the longitudinal direction of the hull, an engine mounted within the hull adjacent said center of buoyancy, auxiliary parts including an oil tank and a muffler being collectively arranged around said engine, said hull including a surrounding wall forming an engine compartment for said engine and said wall protruding upwardly and forming an opening for said engine compartment, a hood with a seat placed removably over said opening of said engine compartment, and the location where the lower edge of said hood and the upper edge of the surrounding wall of said engine compartment are joined being located above the draft line of said hull when the watercraft is stationary in the water and is occupied by the rated number of persons.

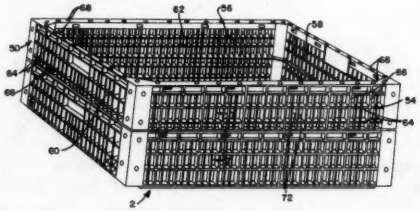
4,998,967

POULTRY DRAWER

Thomas Box, Shrewsbury, N.J., assignor to Spectrum International, Inc., Shrewsbury, N.J.

Filed Sep. 25, 1989, Ser. No. 411,711
Int. Cl.[5] A01K *31/07*
U.S. Cl. 119—22 **2 Claims**

1. A poultry drawer comprised of
(a) two longitudinal sides;
(b) two lateral sides;
(c) a rib structure surrounding the longitudinal and lateral sides;
(d) a bottom;
(e) a structural reinforcement member supporting the bottom; and



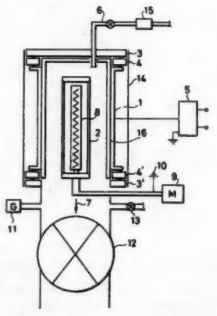
(f) a one-piece height extension comprising continuous upper and continuous lower flange surfaces.

4,998,968

PLASMA CVD APPARATUS

Teruo Misumi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 332,429, Mar. 30, 1989, abandoned, which is a continuation of Ser. No. 140,957, Jan. 4, 1988, abandoned, which is a continuation of Ser. No. 686,151, Dec. 26, 1984, abandoned. This application Aug. 23, 1989, Ser. No. 397,353
Claims priority, application Japan, Jan. 24, 1984, 1-9518
Int. Cl.[5] C23C *16/50*
U.S. Cl. 118—723 **40 Claims**



1. A plasma CVD apparatus having a vacuum chamber wall for forming a deposition film on a base, comprising:
an electrode;
means for causing a discharge in a space between the base and said electrode; and
a non-consumable auxiliary member removably disposed on a surface of said electrode between the base and said electrode, said auxiliary member substantially covering said electrode and being in electrical contact with said electrode to act as said electrode, wherein said auxiliary member covers the vacuum chamber wall of the CVD plasma apparatus and contributes to said discharge.

4,998,969

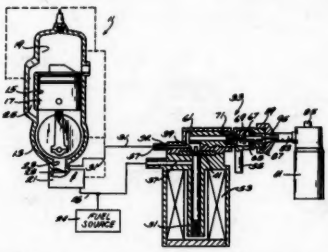
ENGINE MAINTENANCE FLUID INTRODUCTION SYSTEM

William W. Bowers, Waukegan; M. Jeremy Lieb, Northbrook, both of Ill., and Robert J. Shockey, Miami, Fla., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed May 14, 1990, Ser. No. 523,328
Int. Cl.[5] F02M *1/16*
U.S. Cl. 123—187.5 R **10 Claims**

1. An internal combustion engine comprising a cylinder

defining a combustion chamber, and means including a primer fuel conduit communicating with said combustion chamber for



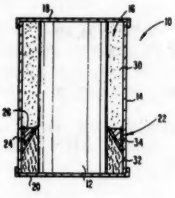
supplying a primer fuel to said combustion chamber, and means for introducing an engine maintenance fluid into said conduit.

4,998,970

APPLIANCE CONSTRUCTION INCLUDING A SEALING DEVICE

Thomas E. Nelson, Anchorage, Ky., assignor to Soltech, Inc., Shelbyville, Ky.

Division of Ser. No. 216,384, Jul. 7, 1988, Pat. No. 4,875,272.
This application Jun. 5, 1989, Ser. No. 362,001
Int. Cl.[5] A47J *27/10*
U.S. Cl. 126—376 **14 Claims**



1. An appliance comprising:
a. a first wall surface;
b. a second wall surface spaced from the first wall surface defining a space therebetween; and,
c. an insulation and sealing device located in the space, and in sealing contact with both the first wall surface and second wall surface, the sealing device comprising:
means defining an open topped trough fabricated of a flexible material, the width of the trough across the open top being at least approximately equal to the width of the space between the first and second surfaces; and,
a resilient insulation material in the open topped trough and exposed at the open top of the trough.

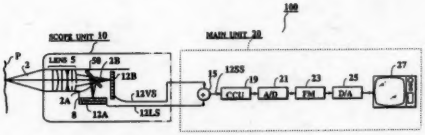
4,998,971

ELECTRONIC ENDOSCOPE APPARATUS CAPABLE OF OBSERVING LASER-ILLUMINATED BIOLOGICAL BODY PORTION

Souhei Fukunishi, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 19, 1990, Ser. No. 540,003
Claims priority, application Japan, Jun. 22, 1989, 1-158400
Int. Cl.[5] A61B *1/04*
U.S. Cl. 128—6 **12 Claims**

1. An electronic endoscope apparatus comprising:
electronic scope unit and a main endoscope unit coupled to the electronic scope unit, the electronic scope unit including:
laser mirror means upon which laser light reflected from a body cavity of a biological body under medical examination is incident, for refracting a first light component having a laser light wavelength of the incident laser light and also for passing therethrough a second light component having a visible light wavelength other than the laser light wavelength;
first image sensor means for receiving the first light component refracted from the laser mirror means;
second image sensor means for directly receiving the second light component passing through the laser mirror means to produce a visible light image signal; and,



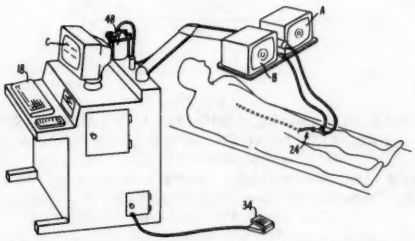
brightness-lowering means positioned on a light-receiving surface of the first image sensor means, for lowering brightness of the first light component having the laser light wavelength, thereby producing a laser light image signal from the first image sensor means; and,
The main endoscope unit processing both the visible light and laser light image signals to display an endoscopic image of the laser-illuminated body cavity and of a body portion around the laser-illuminated body cavity without any halation phenomenon.

4,998,972

REAL TIME ANGIOSCOPY IMAGING SYSTEM

Albert K. Chin, Palo Alto; Anthony A. Nobles, Carson, and Kwok Y. Lai, Los Angeles, all of Calif., assignors to Thomas J. Fogarty, Palo Alto, Calif.

Continuation of Ser. No. 187,591, Apr. 28, 1988, abandoned.
This application Mar. 23, 1989, Ser. No. 328,760
Int. Cl.[5] A61B *1/06*
U.S. Cl. 128—6 **26 Claims**

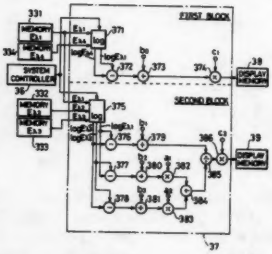


1. An angioscopy imaging system for visualizing the interior of a vessel, such as an artery, the system comprising:
(a) a central processing unit;
(b) optical scanning means for insertion into the interior of the vessel for generating an image of the interior of the vessel, the optical scanning means being connected to the central processing unit for control thereby; and
(c) irrigation means for introducing pulses of flush solution into the interior of the vessel to provide a clear viewing field within the vessel for the optical scanning means, the irrigation means being connected to the central processing unit for control thereby such that the generation of the image is synchronized with the pulsed introduction of flush solution.

4,998,973
ENDOSCOPE

Katsuya Kikuchi, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 15, 1988, Ser. No. 206,844
Claims priority, application Japan, Jun. 16, 1987, 62-147909
Int. Cl.[5] A61B 1/06, 5/14
U.S. Cl. 128—6 **14 Claims**



1. An endoscope, comprising:
means for generating light beams of different wavelengths toward an object;
pickup means for picking up picture signals from the object by using the light beams, and also picking up correction signals from a reference member by using the light beams; and
calculation means for calculating a bloodstream amount I_{HB} and an oxygen saturation rate Iso_2 from the picture signals and the correction signals according to formulas (1), (2) and (3) below,

$$\Delta A_{ij} = \log \frac{E\lambda i}{E\lambda j} + \log \frac{Er\lambda j}{Er\lambda i} \quad (1)$$

wherein Eλi and Eλj are the picture signals and Erλi and Erλj are reference picture signals as the correction signals, wherein λi and λj are wavelengths and wherein i and j are integers 1, 2, 3, 4, . . .

$$I_{HB} = 200\ \Delta A_{14} \ldots \quad (2)$$

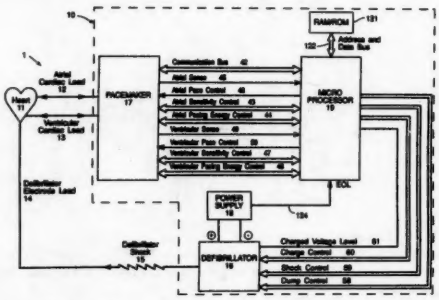
$$Iso_2 = 0.673 \cdot \left(\frac{0.45 \cdot \Delta A_{21} + 0.55 \cdot \Delta A_{23}}{\Delta A_{13}} \right) \quad (3)$$

4,998,974
APPARATUS AND METHOD FOR ANTITACHYCARDIA PACING IN DUAL CHAMBER ARRHYTHMIA CONTROL SYSTEM

David Aker, Elanora Heights, Australia, assignor to Telectronics Pacing Systems, Inc., Englewood, Colo.

Filed Jan. 5, 1990, Ser. No. 462,499
Int. Cl.[5] A61N 1/368
U.S. Cl. 128—419 PG **48 Claims**

1. A dual chamber antitachycardia pacing device for the reversion of tachycardias in a heart comprising: means for detecting tachycardia, means for measuring cycle length of said tachycardia, means for determining a VA interval value less than or equal to the tachycardia cycle length, means for determining an initial value AV delay interval, pulse generating means responsive to said tachycardia detecting means for generating heart stimulating pulses for the atrium and for the ventricle, said pulse generating means including means for delivering a series of M pulse trains with each train consisting of a total of 2N pacing pulses delivered in an alternating sequence to the ventricle and to the atrium, so that timing of said delivered pulses is in accordance with the values of the VA interval and the AV interval, whereby each train comprises the delivery of a pacing pulse to the atrium at the expiration of each of N VA delay intervals and a pacing pulse to the ventricle at the expiration of each of N AV delay intervals, and

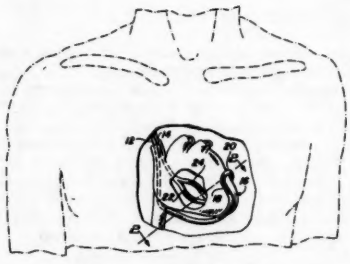


means for varying said AV delay interval from said programmed initial value at least once prior to completion of said series of M pulse trains.

4,998,975
TRAVENOUSLY PLACED DEFIBRILLATION LEADS

Donald M. Cohen, Irvine, and James R. Thacker, Canyon Country, both of Calif., assignors to Siemens-Pacesetter, Inc., Sylmar, Calif.

Filed Oct. 30, 1989, Ser. No. 429,440
Int. Cl.[5] A61N 1/00
U.S. Cl. 128—419 D **30 Claims**



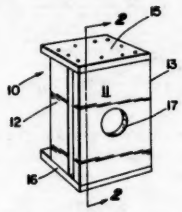
1. A cardiac defibrillation system comprising:
an epicardial electrode for making physical contact with the epicardium of a human heart from a position within the pericardial space of the heart;
means for transvenously inserting said epicardial electrode into the pericardial space;
an endocardial electrode for making physical contact with the endocardium of the heart; and
means for selectively placing a momentary electrical potential between said epicardial and endocardial electrodes, said momentary electrical potential being sufficient to cause a momentary pulse of electrical energy to be delivered to the myocardial tissue intermediate said epicardial and endocardial electrodes; said electrical energy being sufficient to cause the myocardium of the heart to depolarize.

4,998,976

PERMANENT MAGNET ARRANGEMENT

Uri Rapoport, 425 S. Harvey, Oak Park, Ill. 60302

Filed Oct. 7, 1987, Ser. No. 106,114
Int. Cl.[5] A61B *5/055*
U.S. Cl. 128—653 OSC **24 Claims**



1. A permanent magnet assembly for providing a magnetic field across an air gap comprising:

a ferromagnetic housing;

first and second permanent magnet groupings in said housing, each such grouping including:

(a) a principal permanent magnet having a magnetization direction,

(b) a ferromagnetic pole piece having opposite front and rear faces and an outer periphery, said principal permanent magnet contacting said rear face of said pole piece,

(c) auxiliary permanent magnet means having a magnetization direction and being positioned at, contacting and extending about said outer periphery of said pole piece;

said principal permanent magnet and said auxiliary permanent magnet means in said first magnet grouping being positioned with said magnetization directions thereof extending substantially perpendicular to one another and having north magnetic poles on the surfaces thereof engaging said pole piece in said first magnet grouping for providing a north magnetic pole on said front face of said pole piece in said first magnet grouping;

said principal permanent magnet and said auxiliary permanent magnet means in said second magnet grouping being positioned with said magnetization directions thereof extending substantially perpendicular to one another and having south magnetic poles on the surfaces thereof engaging said pole piece in said second magnet grouping for providing a south magnetic pole on said front face of said pole piece in said second magnet grouping;

said first and second magnet groupings being positioned in said housing with said north and south magnetic poles on said front faces of said pole pieces facing one another in spaced-apart relationship to provide an air gap across which a magnetic field extends to define a test zone;

said auxiliary permanent magnet means acting to enhance the strength and uniformity of said magnetic field in said test zone;

said housing having means for allowing insertion of an object to be tested into said test zone;

each said pole piece in each of said first and second magnet groupings having a longitudinal axis;

each said front face on each said pole piece having a depression therein substantially centered on and symmetrical about said longitudinal axis thereof;

each said depression extending across substantially more than one-half of said front face of each said pole piece and having a depression surface;

substantially the entire area of said depression surface being non-perpendicular to said longitudinal axis;

substantially the entire area of said depression surface being non-perpendicular to said longitudinal axis;

said front face of each said pole piece having a circumferential flat area thereon outwardly of and extending completely around said depression thereon; and,

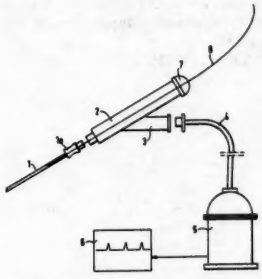
spacer means of non-ferromagnetic material interposed between said circumferential flat areas of said pole pieces and said auxiliary permanent means in said first and second magnet groupings for maintaining said pole pieces and said auxiliary permanent magnet means spaced-apart from one another against the magnetic attraction force therebetween, said test zone being inwardly of said spacer means.

4,998,977

PUNCTURE SET FOR MEDICAL USE

Dieter Preiss, Schmidhofener Str. 22, Heitersheim-Gallenweiler, Fed. Rep. of Germany 7843, and Harald Wilke, Zur Schnapphahner Dell 5, St. Ingbert, Fed. Rep. of Germany 6670

Filed Sep. 10, 1987, Ser. No. 94,780
Claims priority, application Fed. Rep. of Germany, Mar. 2, 1987, 3706625
Int. Cl.[5] A61B *5/02*
U.S. Cl. 128—673 **12 Claims**



1. A puncture set for introducing a catheter into a blood vessel according to the Seldinger technique, comprising:

a puncturing-cannula having a grip piece thereon;

a connecting piece removably connected to said cannula;

a hollow chamber in said connecting piece communicating with said cannula;

sealing means at a proximal end of said connecting piece;

a guide wire slidably insertable through said sealing means in sealing relation therewith and through said connecting piece, chamber and cannula;

a lateral nipple on said connecting piece communicating with said hollow chamber in the interior of said connecting piece; and

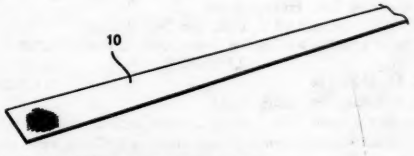
pressure measurement means connectable with said lateral nipple for communication with said hollow chamber for indicating successful puncture of said blood vessel by said puncturing-cannula.

4,998,978

TOOTH CLEANING STRIP

Shirley B. Varum, 27775 Williams Canyon Rd., Gaston, Oreg. 97119

Filed Jan. 10, 1990, Ser. No. 463,268
Int. Cl.[5] A61C *15/00*
U.S. Cl. 132—321 **2 Claims**



1. A tooth cleaning strip comprising:

a flat, single layer, flexible strip having opposite surfaces, side edges, and a length by means of which it can be

reciprocated longitudinally in contoured rubbing engagement with toothed surfaces in the interproximal areas thereof,

said strip being constructed of strands crossed at right angles in a woven structure and forming cross ridges in said surfaces that are capable of producing a frictional scrubbing engagement against tooth surfaces when the strip is reciprocated longitudinally against the tooth surfaces,

a non-raveling portion along at least one of said side edges,

said strip having a width up to about ¼inch and a thickness up to about 4 mls.

4,998,979

METHOD FOR WASHING DEPOSITION FILM-FORMING DEVICE

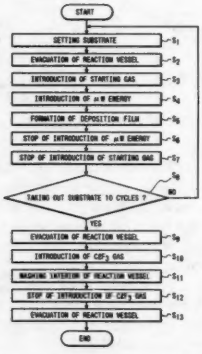
Hiroaki Niino, Nagahama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 6, 1989, Ser. No. 362,016

Claims priority, application Japan, Jun. 6, 1988, 63-138868; Jun. 2, 1989, 1-139263

Int. Cl.[5] C03C *15/00*; B08B *7/00*

U.S. Cl. 134—1 **4 Claims**



1. A method for cleaning excess reaction product from a deposition film-forming device which utilizes microwave plasma chemical vapor deposition for forming a deposition film on a substrate positioned in a reaction vessel, which comprises: (a) introducing ClF_3 gas into said reaction vessel after removing said substrate upon which said deposition film is formed from said reaction vessel; and (b) applying microwave energy, thereby removing the reaction product attached on the interior of said reaction vessel during formation of the deposition film.

4,998,980

CASTING TIRE INCLUDING CONTINUOUS CIRCUMFERENTIAL SIDEWALL INDENTATIONS

Masayuki Katou, Kobe, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

Filed Oct. 3, 1988, Ser. No. 252,390

Claims priority, application Japan, Oct. 8, 1987, 62-255922

Int. Cl.[5] B60C *7/10*

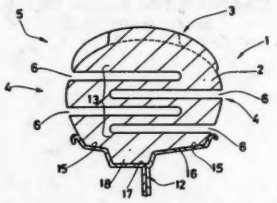
U.S. Cl. 152—324 **12 Claims**

1. A casting tire comprising:

an elastic main body having a tread surface and sidewall surfaces each extending from one edge of said tread surface,

the main body being provided with at least one indentation on each of the sidewall surfaces,

the indentations extending substantially to the tire equatorial plane from the sidewall surface in the axial direction of the



tire, and the indentations extending substantially continuously in the circumferential direction of the tire.

4,998,981

BIT FOR DRILLING AN UNDERCUT HOLE

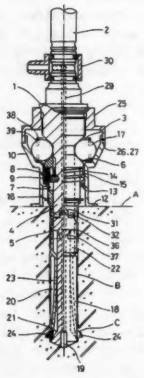
Masaaki Miyanaga, Ashiya, Japan, assignor to Kabushiki Kaisha Miyanaga, Miki, Japan

Filed Apr. 24, 1990, Ser. No. 513,563

Claims priority, application Japan, Apr. 24, 1989, 1-104188

Int. Cl.[5] E21B *7/28, 10/32*

U.S. Cl. 175—286 **3 Claims**



1. A drill bit for drilling an undercut hole, comprising:

a body portion (1) having an upper shank (2), a lower shank (4) and an intermediate downwardly tapered surface (3);

an slide sleeve (5) located around the lower shank (4) for rotation with and axial movement relative to the lower shank and having an upwardly tapering surface (6) adjacent to and spring biased towards the tapered surface (3) of the body portion (1);

a guide sleeve (10) located around the slide sleeve (5) for rotational and axial movement relative to the slide sleeve and having a flared upper end (11) spring biased away from the tapered surfaces of the body portion and slide sleeve;

a plurality of drive bodies (17) located within the flared upper end (11) of the guide sleeve (10) and against the tapered surfaces of the body portion and slide sleeve;

a drill bit (18) attached axially to the lower shank (4) and having longitudinal flutes (20) in its peripheral surface, the flutes having tapered lower ends (21); and

a plurality of fingers (22) depending from the slide sleeve (5) and accommodated within the flutes (20) of the drill bit (18), each finger having a cutting edge (24) at its lower end, the arrangement being such that upward axial movement of the guide sleeve (10) forces the drive bodies (17) between the tapered surfaces (3,6) thereby forcing the slide sleeve (5) and dependent fingers (22) downwardly

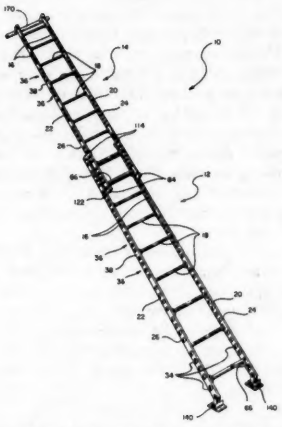
relative to the drill bit (18) and causing the lower ends of the fingers (22) to ride over the tapered ends (21) of the flutes (20) and force the cutting edges (24) radially outwardly of the drill bit.

4,998,982

METAL LADDER CONSTRUCTION WITH REINFORCED SIDE RAILS

William F. Arnold, and Bill M. Arnold, both of 1405 Waterless Dr., Fayetteville, N.C. 28306

Filed Dec. 16, 1988, Ser. No. 285,405
Int. Cl.[5] E06C *1/383, 7/08*
U.S. Cl. 182—159 18 Claims



1. A lightweight construction for a metal extension ladder
(a) a first and second ladder section disposed adjacent one another with ends overlapping, each of which includes:
(1) a pair of spaced apart side rails comprising an elongated tubular member with a generally rectangular configuration and a structural web disposed within the tubular member for reducing flexure of the side rails:
(2) a series of apertures formed in the side rails at spaced intervals for reducing the weight of the side rails, said series of apertures extending substantially the entire length of the side rails;
(3) a plurality of rungs extending between and attached to said side rails;
(b) means for securing said first and second ladder sections together to allow for relative longitudinal movement between the first and second ladder sections;
(c) means for locking the first and second ladder sections to prevent relative longitudinal movement therebetween.

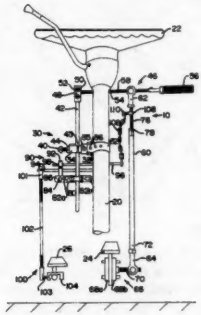
4,998,983

MANUALLY OPERATED APPARATUS FOR CONTROLLING THE BRAKE AND ACCELERATOR OF A MOTOR VEHICLE

Peter B. Ruprecht, Hopatcong, and Mario Agostinelli, West Paterson, both of N.J., assignors to Drive-Master Corp., Fairfield, N.J.

Filed Jun. 2, 1989, Ser. No. 360,995
Int. Cl.[5] B60K *41/20*
U.S. Cl. 192—1.52 11 Claims

1. Apparatus for operating the brake and accelerator of a motor vehicle by hand controls comprising,
housing means for removably mounting said apparatus in assembled position on said motor vehicle,
operating means having a distal end pivotally connected to said housing means and a proximate end including handle means movable in a first direction to operate the brake of the motor vehicle and movable in a second direction to release the brake and actuate the accelerator of the motor vehicle,
telescoping means having a first pivotal means adjustably connectable and movable with the operating means on movement of the handle means, and a second pivotal means adjustable relative the first pivotal means for connection to the brake of the motor vehicle,
lever means pivotally and adjustably connected to said housing means in spaced relation to said operating means,
fulcrum bar means fixedly connected to said housing means



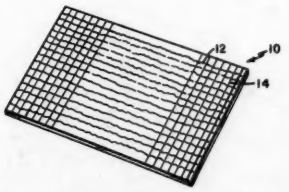
and having a near end pivotally connected to said distal end of said operating means and a far end pivotally connected to said lever means,
accelerator actuating means having a first end pivotally connected to said lever means and a second end adjustably spaced from said first end for attachment to the accelerator of the motor vehicle, and
lost motion connecting means for operative connection to said telescoping means and said lever means for operating said accelerator actuating means only when said operating means moves said telescoping means in said second direction to release the brake of the motor vehicle.

4,998,984

PREMOISTENED PREPACKAGED DISPOSABLE DISINFECTANT WIPER

Evelyn McClendon, 233 Eastern Pkwy., Newark, N.J. 07108

Filed Nov. 15, 1989, Ser. No. 436,822
Int. Cl.[5] B65D *81/24*
U.S. Cl. 206—205 20 Claims



1. An article of manufacturing comprising a disposable wiper pad which is impregnated, and is retained premoistened, with a liquid disinfectant composition that is effective to cleanse by wiping from an inanimate substantially nonporous surface, a broad spectrum of infectuous microorganisms including that identified as the human immunodeficiency virus, said composition comprising from about 0.01 percent to about 1.0 percent based on the weight of the liquid composition of a disinfectant selected from the group consisting of phenol, xylenol and sodium hypochlorite, said premoistened wiper pad

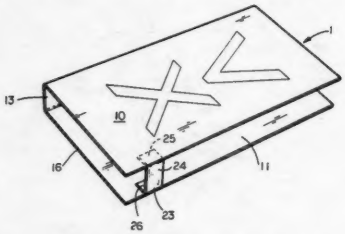
being prepackaged in a container which is substantially liquid impermeable.

4,998,985

METHOD OF UTILIZING A VIDEOCASSETTE IDENTIFYING STORAGE AND DISPLAY SLEEVE

James K. Sankey, Hudson, Ohio, assignor to Alpha Enterprises, Inc., East Canton, Ohio

Filed Apr. 12, 1990, Ser. No. 507,916
Int. Cl.[5] B65D *85/672;* B31B *1/72, 7/14*
U.S. Cl. 206—387 3 Claims



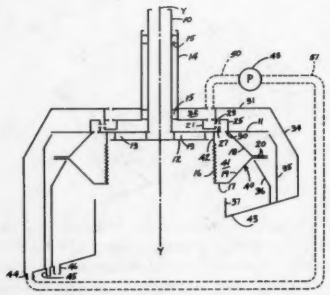
1. The method of utilizing a sleeve having identifying indicia on its exterior surfaces for storing and displaying a videocassette in several different arrangements, said sleeve consisting of a pair of spaced-apart parallel front and rear walls joined by a pair of sidewalls, said sleeve having at least one open end to form a rectangular-shaped storage chamber, the method comprising the steps of removing one lengthwise sidewall of said sleeve leaving the other sidewall hingedly connecting said front and rear walls, said sleeve being adapted to displaying its exteriorly-facing indicia in flattened relation, rejoining the edges of said front and rear walls with a discrete U-shaped tab member having adhesive material on its leg portions and an intermediate portion having a dimension complemental to the said hinged sidewall to reform said rectangular-shaped storage chamber adapted to receive said videocassette in slidable telescoping relation.

4,998,986

CENTRIFUGAL JIG PULSING SYSTEM

Thomas P. Campbell, Coos Bay, Oreg., assignor to Trans Mar, Inc., Spokane, Wash.

Filed Jan. 25, 1990, Ser. No. 471,097
Int. Cl.[5] B03B *5/12*
U.S. Cl. 209—44 18 Claims



1. A centrifugal jig, comprising:

a rotor movably mounted for rotation about a reference axis, the rotor including a perforated screen and a surrounding hollow hutch, wherein the screen includes coaxial inner and outer surfaces centered about the reference axis and the hutch has an interior space normally filled with fluid during operation of the jig, the interior space of the hutch extending radially outward from the screen to a series of peripheral hutch outlets;

feed means for directing incoming slurry to the inner surface of the screen;

a stationary shroud having an interior space enclosing the rotor;

at least one fluid nozzle, the fluid nozzle being adapted to be in communication with a source of continuously flowing pressurized fluid, the fluid nozzle having an open outlet defined by a surrounding solid wall arranged in a first arcuate path centered about the reference axis, the outlet of the fluid nozzle being located within the interior space of the shroud;

at least one pulse block mounted to the rotor, the pulse block having an outlet in open communication with the interior space of the hutch, the pulse block further having an open inlet in communication with its outlet, the pulse block inlet being defined by a surrounding solid wall arranged along a second arcuate path centered about the reference axis and being adapted to periodically overlap the fluid nozzle outlet to place them in open communication with one another during rotation of the rotor, the solid wall surrounding the pulse block inlet that overlaps the fluid nozzle outlet at any time during rotation of the rotor having an area that is substantially less than the area of the fluid nozzle outlet;

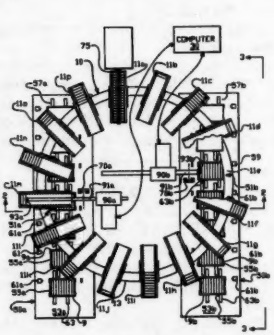
whereby continuously flowing pressurized fluid supplied to the fluid nozzle can be alternately directed either to the interior space of the hutch through the pulse block or to the interior space of the shroud to thereby periodically direct fluid pulses to the interior space of the hutch without ever completely obstructing flow of fluid through the fluid nozzle outlet while the rotor is rotated about the reference axis.

4,998,987

AUTOMATIC DISC GAUGING AND SORTING APPARATUS

William G. Jacobs, San Jose, Calif., assignor to Seagate Technology, Inc., Scotts Valley, Calif.

Continuation of Ser. No. 276,213, Nov. 23, 1988, abandoned.
This application Aug. 1, 1990, Ser. No. 561,489
Int. Cl.[5] B07C *5/08*
U.S. Cl. 209—552 17 Claims



1. An automatic disc gauging and sorting apparatus for transporting discs to a disc gauging station, gauging the thickness of the discs and sorting the discs into a series of predetermined ranges of varying thickness comprising:

at least one cassette transport means, each of said transport means having a disc pick-up position and said transport means also having plurality of disc transport containers mounted on said cassette transport means, said plurality of

transport containers are able to move towards and away from said disc pick-up position;

at least one disc gauging means adjacent said disc pick-up position for gauging the thickness of the discs to be sorted;

disc sorting unit including a plurality of spaced apart disc sorting containers which are mounted on said disc sorting unit, said disc sorting containers are movable to a location adjacent said disc gauging means, said location being where discs to be gauged and sorted are transferred from said plurality of cassette transport containers to said disc sorting containers, each of said containers being designated to receive discs of a single predetermined thickness range selected from a plurality of thickness ranges:

at least one disc shuttle arm unit associated with said disc sorting unit adjacent said disc pick-up position for removing a disc from a cassette in said disc pick-up position, inserting said disc into said disc gauging means, removing said disc from said disc gauging means and placing said disc in the proper designated container for its determined thickness; and

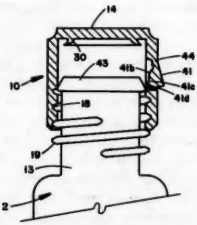
control means coupled to said disc sorting unit for controlling the operations of said disc sorting unit, said cassette transport means, said disc gauging means and said shuttle arm unit.

4,998,988

TAMPER EVIDENCING CAP AND CONTAINER

Gerald Zinnbauer, Charlotte, N.C., assignor to Kardon Industries, Inc., Philadelphia, Pa.

Filed Sep. 20, 1989, Ser. No. 409,827
Int. Cl.[5] B65D *41/34*
U.S. Cl. 215—230 **21 Claims**



1. A tamper evident closure for an open container having an outwardly projecting finish approximate the container opening, said closure comprising:

a hollow body which encloses the finish and has a closed end and an opened end; and

tamper evidencing means disposed within said body, said tamper evidencing means which is substantially coplanar with an exterior surface of the hollow body including a hinged element which is displaced outwardly from the coplanar relationship by engagement of said hinged element with the enclosed finish during removal of the closure.

4,998,989

TAMPER EVIDENT CLOSURE AND ASSOCIATED METHOD

Yoram Curiel, Aurora, Colo., assignor to TSL Incorporated, Aurora, Colo.

Continuation-in-part of Ser. No. 347,363, May 4, 1989, Pat. No. 4,928,837. This application May 25, 1990, Ser. No. 529,342
Int. Cl.[5] B65D *51/00*
U.S. Cl. 215—250 **43 Claims**

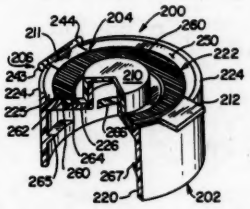
1. A tamper evident closure for a container comprising:

a closure body having an end wall and a skirt depending from said end wall;

a closure lid movably secured to said closure body;

said end wall and said closure lid defining an upwardly open recess; and

a cured brittle layer disposed in said recess such that a portion of said layer contacts said end wall and another portion of said layer contacts said closure lid, whereby relative movement of said closure lid away from said end wall will cause a readily visible irreversible fracture of said layer and separation of at least one piece of said layer from at least one of said closure lid and said end wall.

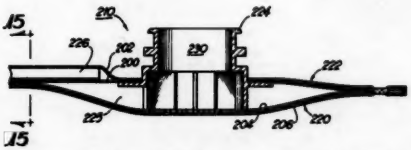


4,998,990

COLLAPSIBLE BAG WITH EVACUATION PASSAGEWAY AND METHOD FOR MAKING THE SAME

Simon J. Richter, and Alva C. Cobb, both of Marietta, Ga., assignors to The Coca-Cola Company, Atlanta, Ga.

Continuation-in-part of Ser. No. 287,187, Dec. 20, 1988, Pat. No. 4,893,731. This application Jan. 12, 1990, Ser. No. 464,479
Int. Cl.[5] B65D *30/26*
U.S. Cl. 222—92 **29 Claims**



1. A collapsible bag for use in containing and dispensing a liquid comprising:

(*a*) a liquid tight bag having a flexible bag wall and wherein said bag wall includes at least a pair of separate bag wall layers including an inner bag layer and an outer bag layer;

(*b*) a spout attached to said bag wall and said spout and bag wall having a spout opening therethrough in liquid communication with the inside of said bag;

(*c*) an elongated reinforcing strip sealed to an outside surface of said inner bag layer of said bag wall and extending from adjacent to said spout to a position remote from said spout; and

(*d*) said reinforcing strip including at least one elongated groove therein which also exists in the portion of said inner bag layer of said bag wall attached to said reinforcing strip, said groove providing at least one elongated liquid passageway inside of said bag in liquid communication with said spout opening, said at least one passageway having a depth and a width such that as said bag wall collapses during dispensing of liquid from the bag, the bag wall can not collapse into and block said passageway, such that said passageway remains open to achieve complete withdrawal of liquid from said bag as said bag collapses.

4,998,991

MATERIALS HANDLING EQUIPMENT

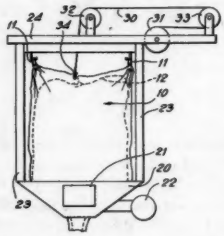
Barrie A. Poulton, Cheltenham, England, assignor to Flomat Limited, Derbyshire, England

Filed Dec. 1, 1989, Ser. No. 444,533

Claims priority, application United Kingdom, Dec. 9, 1988, 8828774.3

Int. Cl.[5] B67D *3/00*

U.S. Cl. 222—181 11 Claims



1. Equipment for assisting the discharge of particulate materials from an intermediate bulk container of the kind comprising an outer bag with an upper, substantially closed end and a lower open end and having an inner liner with a closed upper end and a lower open end and comprising frame members to which the upper end of the outer bag of the intermediate bulk container can be anchored, cord means extendable against the action of resilient means and adapted to be connected through an opening in the upper end of said bag with the upper end of the inner liner to the outer bag, pulley means for guiding the cord means to the position of connection with the liner, a pivoted arm and means for attaching the free end of the cord means to the arm at a position spaced from its pivot, the arrangement being such that the arm can be swung to carry the free end of the cord means to a position to facilitate connection with the liner whereby material can be discharged from the open lower end of the liner.

4,998,992

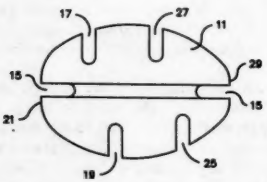
WIG STAND WITH VENTILATION CHANNELS

Milton Richlin, 829 Finch Dr., Bensalem, Pa. 19020, and Aloysius Dubeck, 401 Manor Dr., Hampton, N.J. 08837

Filed Mar. 30, 1990, Ser. No. 501,288

Int. Cl.[5] A47F *8/00*

U.S. Cl. 223—66 6 Claims



1. A wig stand comprising a compressible, open cell foam formed to resemble the shape of the human head, said wig stand having a substantially flat base and having a plurality of channels sufficient to ventilate the area under a wig resting on said wig stand.

4,998,993

SPRAYING GUN

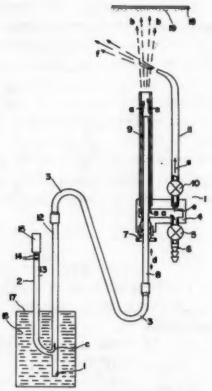
Tibor Kenderi, and László Kenderi, both of Kelenhegyi ut 49, Budapest, Hungary

PCT No. PCT/HU83/00009, § 371 Date Oct. 5, 1984, § 102(e) Date Oct. 5, 1984, PCT Pub. No. WO84/03237, PCT Pub. Date Aug. 30, 1984

PCT Filed Feb. 17, 1983, Ser. No. 662,232

Int. Cl.[5] B05B *7/24, 7/30*

U.S. Cl. 239—295 2 Claims



1. A spraying gun for applying and spraying liquids and solid particulate materials such as dyestuffs, slurry or granular substances comprising a material feeding unit; a spraying head consisting of a straight material charging pipe, a blast pipe enclosing the charging pipe for controlling the material stream and the cone angle of the outlet stream, wherein said charging pipe and said blast pipe are parallely and mutually displacable relative to each other; and an air-jet pipe neither enclosing or enclosed by the charging pipe or the blast pipe defining an angle with the direction of the outlet stream for controlling the material stream direction; and a connecting pipeline interconnecting the material feeding unit and the spraying head, wherein said material feeding unit consists of (a) a pipe for false air connected to the connecting pipeline or to a material suction pipe in said material feeding unit connecting the said connecting pipeline with an open vessel or (b) a material feeding pump provided with a vessel connected to the connecting pipeline.

4,998,994

AERODYNAMICALLY COMPLIANT PROJECTILE NOSE

Edward M. Schmidt, Forest Hill, and William F. Donovan, Aberdeen, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 20, 1989, Ser. No. 409,900

Int. Cl.[5] F42B *15/027*

U.S. Cl. 244—3.1 12 Claims

7. A high velocity aerodynamic projectile subject to a displacing aerodynamic force during flight comprising:

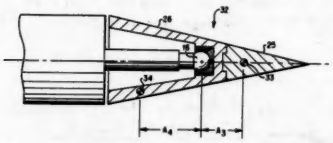
a solid central body having a forward end, a rearward end and a longitudinal axis, said forward end having a single arm pedestal rigidly attached, said pedestal coaxial with said longitudinal axis and extending outward from said solid central body, said pedestal having a spherical bearing affixed at its outward end;

an aft stabilizing means rigidly affixed at the rearward end of said solid central body;

a forward stabilizing means pivotably attached to said spher-

ical bearing of said pedestal of said solid central body, said pedestal extending into the interior of said forward stabilizing means;

said forward stabilizing means comprising a hollow self-aligning projectile nose having a tapering forward nose



section in balance about said spherical bearing with a tapering aft nose section and a rearward end separated a distance between 0.005" to 0.010" from said forward end of said solid central body so as to allow said hollow self-aligning projectile nose to pivot and thereby reduce said displacing aerodynamic force.

4,998,995

AIRCRAFT OF SPLIT TURBO-PROP CONFIGURATION

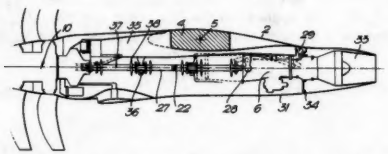
Alan A. Blythe, Hatfield, England, assignor to British Aerospace Public Limited Company, London, England

Filed May 4, 1989, Ser. No. 347,137

Claims priority, application United Kingdom, May 5, 1988, 8810616

Int. Cl.[5] B64D *27/00*

U.S. Cl. 244—55 **9 Claims**



1. An aircraft including at least two wing mounted turbo-prop powerplant installations, each wing including a spanwise extending structural wingbox, a leading edge portion and a trailing edge portion, each of said turbo-prop powerplant installations including:

a gear box/propeller assembly;

a gas turbine engine; and

interconnecting drive shaft means;

said turbo-prop powerplant installations extending longitudinally beneath said wing with said gear box/propeller assembly and said gas turbine engine being spatially separated in fore and aft alignment with respect to said wing and at least said gas turbine engine being displaced apart from said structural wing box, the arrangement being such that in event of disintegration within the gas turbine engine, the risk of serious or catastrophic wing structural damage or failure is minimized.

4,998,996

ADJUSTABLE FULCRUM FOR HAMMERS

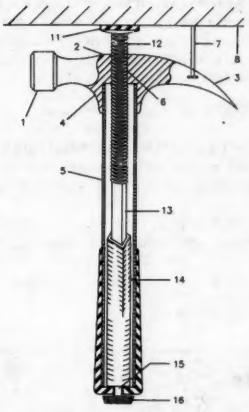
Jacques F. Belanger, 240 Moy Ave., Windsor, Ontario, Canada N9A 2N2

Filed Nov. 22, 1989, Ser. No. 440,503

Int. Cl.[5] B25C *11/00*

U.S. Cl. 254—26 E **8 Claims**

1. A hammer comprising a handle and a head, said handle having a bore, said head including an anvil, a bell and claw, said bell having an aperture in line with said bore, an adjustable fulcrum mechanism disposed axially within said bore and aperture comprising an extendable fulcrum rod threadedly engaging said aperture, rotatable controlling means coupled to said fulcrum rod and having terminally affixed thereto an exteriorly exposed control knob at the end of said handle opposite said head, and wherein the said rotatable controlling means com-



prises a cylindrical member flattened at one end to matingly engage a portion of said fulcrum rod, said portion being machined flat on at least two sides.

4,998,997

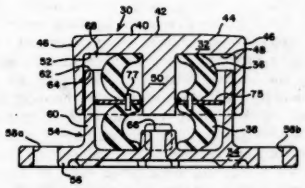
SIDE BEARING UNIT FOR RAILROAD CAR

Robert L. Carlston, Skokie, Ill., assignor to Miner Enterprises, Inc., Geneva, Ill.

Continuation of Ser. No. 310,986, Feb. 15, 1989, abandoned. This application Mar. 5, 1990, Ser. No. 489,799

Int. Cl.[5] F16F *1/36, 1/40*

U.S. Cl. 267—003 **2 Claims**



1. A side bearing unit for use with an articulated railroad car which includes a bolster, said side bearing unit comprising:

a generally round top cap including, a top surface having a center flat portion and a side angled portion, a downwardly depending integrally formed side wall, a bottom surface having a centrally located integrally formed depending secondary solid stop and a primary stop surface adjacent said side wall;

a housing including, a base portion prepared for attachment to said bolster, an integrally formed upward extending side wall having a primary stop portion for cooperation with said primary stop surface adjacent said side wall, a centrally located integrally formed upwardly extending secondary solid stop for cooperation with said depending secondary stop of said bottom surface, whereby said housing fits within said round top cap creating an internal void;

first and second thermoplastic elastomeric springs positioned one on top of the other occupying said internal void, whereby during a total travel cycle, said first and second thermoplastic springs are subjected to folding and flexing, wherein said centrally located integrally formed depending secondary solid stop is journaled in said first

thermoplastic spring and said centrally located integrally formed upward extending secondary solid stop is journaled in said second thermoplastic elastomeric spring; and

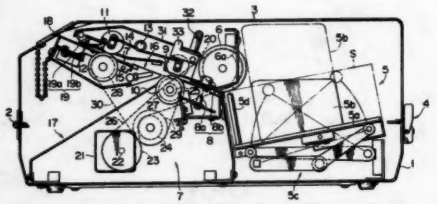
means for movably interlocking said round top cap and said housing whereby when said first and second thermoplastic elastomeric springs are preloaded, a generally flat force versus travel curve is generated for a substantial amount of the movement available between said top cap with respect to said housing.

4,998,998

SHEET DISCRIMINATING APPARATUS

Imai Shigetoshi, Settsu, and Yasuhiko Matoba, Sakai, both of Japan, assignors to Laurel Bank Machines Co., Ltd., Tokyo, Japan

Filed Aug. 8, 1989, Ser. No. 390,883
Claims priority, application Japan, Aug. 12, 1988, 63-106705
Int. Cl.[5] B65H *7/14*
U.S. Cl. 271—263 **4 Claims**



1. A sheet discriminating apparatus comprising light emitting means for emitting light onto a sheet being transported, light receiving means for detecting an amount of light transmitted through the sheet and sheet discriminating means for discriminating a specified kind of the sheet from others and/or abnormal feed of sheets based upon the amount of light transmitted through the sheet detected by said light receiving means, said sheet discriminating means comprising average value calculating and storing means for calculating and storing an average value of the amount of light transmitted through the sheet detected by said light receiving means for each of sections into which the sheet is subdivided, reference data calculating and storing means for calculating and storing a reference data for each of the sections of the sheet based upon the average value of light transmitted through a preceding sheet to the sheet to be discriminated stored in said average value calculating and storing means, and average data comparing means for comparing the average value of the amount of light transmitted through the sheet calculated in said average value calculating and storing means with the reference data calculated by said reference data calculating and storing means section by section and discriminating the specified kind of sheet from others and/or abnormal feed.

4,998,999

STEERING COLUMN ASSEMBLY WITH ENERGY ABSORPTION MECHANISM

Naoki Yuzuriha, Kanagawa, and Yoshimi Yamamoto, Shizuoka, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama and Fuji Kiko Company, Tokyo, both of, Japan

Filed Jul. 25, 1989, Ser. No. 384,702
Claims priority, application Japan, Jul. 25, 1988, 63-98141[U]
Int. Cl.[5] B62D *1/18, 1/19*
U.S. Cl. 280—777 **12 Claims**

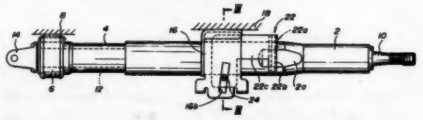
1. A steering column assembly comprising:

a steering column having an upper steering column tube and a lower steering column tube which are telescopically connected at their lower and upper portions respectively;

a stationary bracket fixed to a vehicle body;

an energy absorption bracket having a pair of side walls each extending along the axis of said steering column, a front wall arranged substantially perpendicular to said side walls, a pair of curved sections each having a predetermined radius of curvature and each connecting the corresponding side wall to said front wall;

said energy absorption bracket being fixed to said stationary bracket and fixedly receiving said upper steering column tube for becoming plastically deformed in response to an impact load exceeding a predetermined value to allow said



upper steering column tube to displace downwardly along the axis of said steering column with respect to said lower steering column tube, said impact load being applied to said energy absorption bracket through said upper steering column tube in a direction along the axis of said steering column;

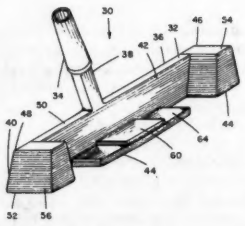
whereby the applied impact load is absorbed through said plastic deformation of the energy absorption bracket.

4,999,000

GOLF CLUBHEAD WITH A HIGH POLAR MOMENT OF INERTIA

Clifton D. Finney, 1057 Oak Hills Pkwy., Baton Rouge, La. 70810

Continuation-in-part of Ser. No. 289,908, Dec. 27, 1988, Pat. No. 4,898,387. This application Dec. 14, 1989, Ser. No. 450,747
The portion of the term of this patent subsequent to Feb. 6, 2007, has been disclaimed.
Int. Cl.[5] A63B *53/04*
U.S. Cl. 273—167 R **20 Claims**



1. A golf clubhead comprising:

a. a body having a predetermined lower density;

b. a head weight means comprising at least one head weight whereby each said head weight has a predetermined higher density greater than said predetermined lower density of said body as inertial weight for said clubhead;

c. a toe and heel, a front and back, and a top and a sole with a ball striking surface toward said front;

d. a binding means to attach said head weight means to said clubhead;

e. a fastening means to affix a shaft between said heel and said toe;

f. a toe section extending from a vertical plane positioned perpendicularly at the midpoint of the length line of said clubhead to the extreme of said toe, and a heel section extending from said vertical plane in the opposite direction to the extreme of said heel;

g. a toe weight means comprising at least one toe weight of the portion of said head weight means in said toe section as inertial weight for said toe section;

h. a mass profile means to position:

(i) a substantial portion of the mass of said toe weight means away from the center of mass of said clubhead toward said toe; and

(ii) the center of mass of said toe weight means behind the extreme front of said ball striking surface no higher than the mid-height of said toe weight means;

i. a characteristic feature of said substantial portion of the mass of said toe weight means adjacent said toe comprising an expanded surface whereby both the height and width of said substantial portion of said toe weight means are generally greater than the length of said substantial portion of said toe weight means;

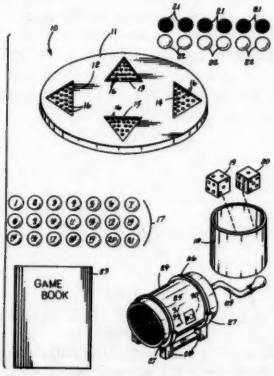
j. whereby, said clubhead is inertially stabilized with respect to twisting.

4,999,001

BINGO GAME APPARATUS

Robert G. Johnson, Jr., 507 Dunlop Dr., Opelika, Ala. 36801

Filed May 7, 1990, Ser. No. 519,806
Int. Cl.[5] A63F *3/06*
U.S. Cl. 273—269 4 Claims



1. A bingo game apparatus comprising, in combination,

a rigid game board, the game board including a top planar surface including a series of equally spaced recessed player positions, the player positions each including a predetermined number of semi-spherical recesses therewithin, wherein each player position includes an equal predetermined number of semi-spherical recesses, and

each of the spherical recesses of each of the player positions sequentially numbered, and

plural sets of sequentially numbered playing spheres, and

dispensing means for receiving the spheres and for dispensing individual spheres from the dispensing means, wherein each of the playing spheres are sequentially numbered to correspond to the sequentially numbered semi-spherical recesses of each player position, and

including four sets of contrastingly colored playing spheres, each of a predetermined diameter, each set of playing spheres defined by a predetermined number of playing spheres equal to a predetermined number of semi-spherical recesses within each player position, and

further including predetermined number of black spheres, and a further predetermined number of white spheres, wherein the black spheres are utilized as a "wild" sphere to be positioned within any one of the semi-spherical recesses within each of the player positions, and the white spheres providing each player with a free turn, and

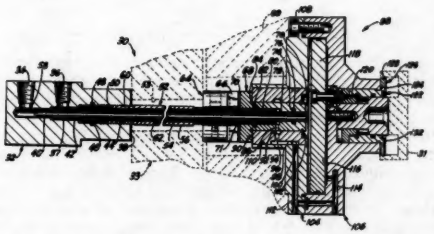
wherein the dispensing means includes a rotatable drum, the rotatable drum including a crank handle directed rearwardly thereof for rotation of the drum, and the rotating drum further including a plurality of cylindrical rings fixedly mounted at a predetermined spacing to an exterior surface of the cylindrical drum, and a plurality of semi-circular grooved support rings spaced apart the predetermined spacing, each receiving a cylindrical ring therewithin to permit support of the drum and relative rotation of the drum relative to the rings, and support legs mounted to the rings for support of the rings and the drum in use.

4,999,002

HIGH SPEED CHUCK APPARATUS

Anton Fink, 149 Crescent Dr., Searington, N.Y. 10507

Filed Aug. 15, 1990, Ser. No. 567,944
Int. Cl.[5] B23B *13/02;* F15B *13/04*
U.S. Cl. 279—2 A 12 Claims



1. A high speed chuck assembly for a machine tool having a rotatable portion for high speed rotation about an axis and having a bore extending therethrough generally along the axis of rotation, said chuck assembly comprising:

an air tube assembly extending nonrotatably through the bore of the machine tool, said air tube assembly defining a plurality of concentric air passageways;

means for selectively delivering air to the air passageways;

an air journal nonrotatably mounted to an end of said air tube assembly and including a plurality of passageways extending therethrough and communicating respectively with the air passageways of the air tube assembly;

a chuck rotatably mountable over and surrounding at least partially the air journal and mountable to the rotatable portion of the machine tool, the chuck including a body having a cylindrical working cavity therein concentric with the axis of rotation, a piston slidably movable in the cylindrical working cavity, passage means extending through the chuck for providing communication from the respective passageways of the air journal to alternate respective sides of the pistons such that selective application of air enables movement of the piston in the cylindrical working cavity;

an actuator rigidly mounted to the piston for slidable movement therewith relative to the body, said actuator having a generally frustum-shaped wedge; and

a clamping assembly in sliding engagement with the wedge of the actuator, the clamping assembly comprising an array of radially aligned jaws, such that movement of the actuator and piston in a first axial direction generates wedge forces against the clamping assembly for urging the clamping assembly in a first radial direction, and such that movement of the piston and actuator in a

second axial direction enables the clamping assembly to move in an opposed radial direction.

4,999,003

APPARATUS FOR STEERING FRONT AND REAR WHEELS OF A MOTOR VEHICLE

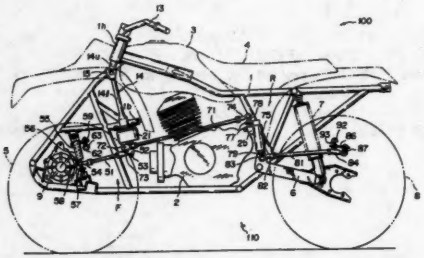
Masaru Koishi; Tomoyuki Yonezawa; Hiroshi Enomoto, and Kazushiro Inoue, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 17, 1988, Ser. No. 233,217

Claims priority, application Japan, Aug. 18, 1987, 62-204698; Sep. 4, 1987, 62-221297; Sep. 4, 1987, 62-221298; Mar. 18, 1988, 63-66657; Mar. 18, 1988, 63-66658

Int. Cl.[5] B60K *17/358*

U.S. Cl. 280—103 13 Claims



1. In a front and rear wheel steering apparatus in an off-road motor vehicle having a vehicle frame, at least one front wheel and rear wheels rotatably supported on said vehicle frame, a steering handle operatively mounted on said vehicle frame, a straddle-type seat mounted on said vehicle frame, a rear swing arm vertically swingably mounted on said vehicle frame and supporting said rear wheels; a front wheel steering mechanism operatively interconnecting said steering handle and said front wheel for transmitting turning movement of said steering handle to said front wheel; and a rear wheel steering mechanism operatively interconnecting said steering handle and said rear wheels for transmitting turning movement of said steering handle to said rear wheels, the improvement wherein:

said front wheel steering mechanism comprises a front wheel steering angle generating mechanism responsive to turning movement in one direction of said steering handle from a neutral position through a prescribed angle to a maximum angle for generating a front wheel steering angle which increases from zero to a maximum value in said one direction as an angle of turning movement of said steering handle increases;

said rear wheel steering mechanism comprises a rear wheel steering angle generating mechanism responsive to turning movement in said one direction of said steering handle from said neutral position to said prescribed angle for generating a rear wheel steering angle in said one direction, and also responsive to turning movement of said steering handle from said prescribed angle to said maximum angle for generating a rear wheel steering angle in a direction opposite to said one direction; and

at least a portion of said rear wheel steering mechanism is coupled to said rear swing arm.

4,999,004

SEAT BELT PRE-TENSIONER

Enar T. Skanberg, Billdal, and Lars B. Axelsson, Vargarda, both of Sweden, assignors to General Engineering (Netherlands) B.V., Utrecht, Netherlands

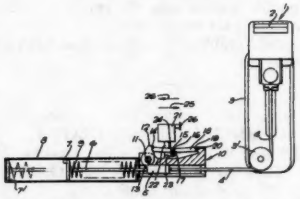
Filed Nov. 8, 1989, Ser. No. 433,003

Claims priority, application United Kingdom, Nov. 14, 1988, 8826609

Int. Cl.[5] B60R *21/10*

U.S. Cl. 297—480 18 Claims

1. A trigger for a pre-tensioner arrangement adapted to apply tension to a safety belt in response to severe deceleration of a vehicle in which the arrangement is fitted, which arrangement comprises force-storing means adapted to store force and adapted to apply the force to a safety belt or to a device associated with the safety belt, and a trigger comprising a pivotted lever which exhibits a mechanical advantage, one end of the lever being adapted to engage part of the pretensioner arrangement for retaining the force-storing means in a predetermined condition, the other end of the lever engaging an over-dead-centre linkage, which prevents the lever from moving pivotally, there being an inertia mass adapted to move in a predetermined way when subjected to said severe deceleration, the inertia mass having means thereon adapted to engage the over-dead-centre linkage and to move the over-dead-centre linkage through the dead-centre condition to release the lever so that the said one end can move under the force from the force-storing means, thus causing the said one end of the lever to be disengaged from said part and the force-storing means to be released to move the safety belt or the said device associated with the safety belt.



4,999,005

WIDE BAND COLOR CORRECTING INFRARED LENS SYSTEM

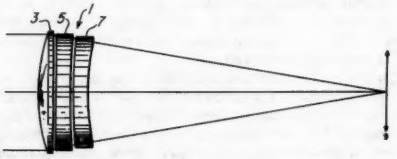
Erwin E. Cooper, 1510 Northridge, Carrollton, Tex. 75006

Filed Oct. 19, 1988, Ser. No. 259,822

The portion of the term of this patent subsequent to Oct. 3, 2006, has been disclaimed.

Int. Cl.[5] G02B *3/00, 9/12*

U.S. Cl. 350—1.4 43 Claims



1. An optional system which comprises:

(a) an infrared refractive lens triplet having color correcting properties for radiation ranging from about 3.5 to about 12 micrometers, said triplet comprising:

(b) a first lens having chromic properties corresponding approximately to about $40 < V < 46$, where:

$V = (N_D - 1)/(N_{13} - N_3)$, ps

wherein, for said first lens glass:

N_D is the refractive index at 8 micrometers,

N_{13} is the refractive index at 13 micrometers, and

N_3 is the refractive index at 3 micrometers;

(c) a second lens comprising germanium; and

(d) a third lens;

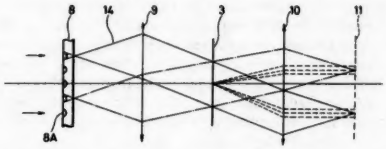
(e) said triplet of lenses being capable of simultaneously focusing radiation in the 3.5 –micrometer and the 8 –12 micrometer range for imaging about a single focal plane.

4,999,006

COHERENT OPTICAL APPARATUS

Kenjiro Hamanaka, Tsukuba, Japan, assignor to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Jun. 6, 1989, Ser. No. 361,940
Int. Cl.[5] G02B *27/42*
U.S. Cl. 350—162.12 6 Claims



1. A coherent optical apparatus comprising:

a microlens array located under coherent illumination and obtained by one- or two-dimensionally arranging microlenses which are integrally formed as a gradient index lens array in a transparent planar substrate;

a first lens located after said microlens array;

a transmission object located after said first lens, at least one of a transmittivity or phase of said transmission object being spatially distributed; and

a second lens located after said transmission object,

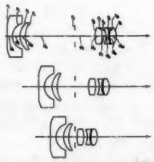
wherein said first lens has a lens diameter for allowing at least two light beams of coherent light beams emitted from said microlenses of said microlens array to transmit through said first lens, said transmission object is located in an area illuminated simultaneously with at least two light beams of the light beams emitted from said microlenses and transmitted through said first lens, and said second lens transmits at least two light beams of the light beams emitted from said microlenses and transmitted through said first lens and said transmission object and simultaneously forms at least two Fourier transform patterns of said transmission object after said second lens.

4,999,007

VARI-FOCAL LENS SYSTEM

Norihiko Aoki; Hirofumi Tsuchida, and Atsujirou Ishii, all of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jan. 26, 1989, Ser. No. 301,971
Claims priority, application Japan, Jan. 28, 1988, 63-15949; Feb. 19, 1988, 63-35022; Feb. 25, 1988, 63-40758
Int. Cl.[5] G02B *15/177*
U.S. Cl. 350—426 16 Claims



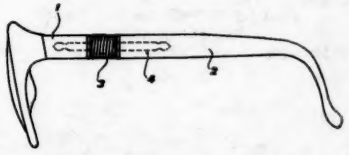
1. A vari-focal lens system comprising, in the order from the object side, a front lens unit consisting of a first subunit having negative refractive power and a second subunit consisting of a positive lens component, and rear lens unit having positive refractive power and including at least a negative lens element, and so adapted as to vary focal length with the image point kept at a fixed location by shifting the first subunit, the second subunit and the rear lens unit while changing relative positions thereof.

4,999,008

FLEXIBLE BAR FOR SPECTACLES AND MANUFACTURING METHOD

Carmine Milone, Venegono Inferiore, Italy, assignor to Mirage S.r.l., Venegono Inferiore, Italy

Filed Nov. 14, 1989, Ser. No. 435,833
Claims priority, application Italy, Nov. 18, 1988, 22667A/88
Int. Cl.[5] G02C *5/16, 5/14*
U.S. Cl. 351—113 8 Claims



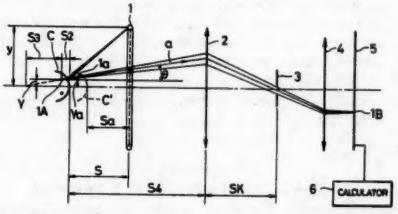
1. Flexible bar for spectacles, formed in two parts of relatively stiff plastic material, joined together by means of an elastic springing element in the form of a spiral spring, characterized in that said elastic element also comprises a flat spring with surface positioned on a vertical plane, in that said spiral spring is wound in tight coils around a central part of said flat spring and is checked on opposite sides by two stop rings, and in that the end parts of said flat spring form means of anchorage into the two bar portions of plastic material.

4,999,009

DEVICE FOR USE WITH A CORNEA SHAPE MEASURING APPARATUS

Isao Matsumura, Yokosuka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 58,579, Jun. 5, 1987, abandoned. This application Nov. 1, 1989, Ser. No. 430,974
Claims priority, application Japan, Jun. 20, 1986, 61-144431
Int. Cl.[5] A61B *3/10*
U.S. Cl. 351—212 20 Claims



1. A device for use with a cornea shape measuring apparatus, comprising:

an index mark projection means for projecting an index mark, said index mark projection means being adapted to be positioned opposite to an eye to be examined;

an imaging optical system means for imaging a corneal reflection real image of the index mark, said imaging optical system means having an objective optical system means and an aperture; and

image detection means for detecting the real image of the index mark, said image detection means being provided at an imaging plane of said imaging optical system means,

wherein said aperture is locatable at a position where a ray, in a direction connecting a position of a corneal reflection virtual image when the index mark is in a correct working position spaced from the cornea to a position of a corneal reflection virtual image when the index mark is in a second position spaced from the correct working position, intersects the optical axis of said objective optical system means after passing through said objective optical system means and wherein said index mark projection means is

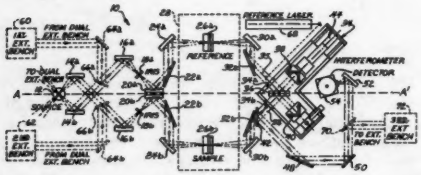
configured and positioned to be disposed such that the ray forms an angle with an optical axis of said objective optical system means.

4,999,010

DUAL BEAM OPTICAL NULLING INTERFEROMETRIC SPECTROMETER

David R. Mattson, Maple Bluff; Joel Covey, and Stephen Weibel, both of Madison, Wis., assignors to Mattson Instruments, Inc., Madison, Wis.

Filed Jul. 31, 1989, Ser. No. 388,646
Int. Cl.[5] G01B *9/02*
U.S. Cl. 356—346 20 Claims



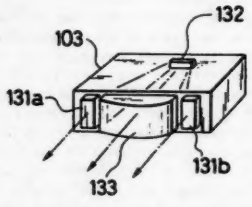
1. A spectrometer comprising:
a source of radiant energy;
first beam forming means for directing a first beam of said radiant energy on a reference sample in forming a first spectrum thereof, said first beam forming means including a first plurality of spaced reflectors;
second beam forming means for directing a second beam of said radiant energy on a sample to be analyzed in forming a second spectrum thereof, said second beam forming means including a second plurality of spaced reflectors;
interferometer means including a beamsplitter and cube corner retroflectors for combining said first and second beams after being respectively directed on said reference sample and said sample to be analyzed so as to form a third beam representing the difference between said first and second beams and containing an interferogram of said sample to be analyzed, wherein said spectrometer includes an axis of symmetry between said source and said interferometer means and wherein said first and second beam forming means are disposed on respective opposed sides of said axis of symmetry; and
single detector means responsive to said third beam for detecting said interferogram.

4,999,011

DISPLAY APPARATUS FOR A VEHICLE

Yoshiyuki Suzuki; Kunimitsu Aoki, and Tadashi Iino, all of Susono, Japan, assignors to Yazaki Corporation, Japan

Division of Ser. No. 182,292, Apr. 15, 1988. This application Feb. 2, 1989, Ser. No. 305,018
Claims priority, application Japan, Apr. 16, 1987, 62-56667; Apr. 16, 1987, 62-56668; May 30, 1987, 62-82134
Int. Cl.[5] G03B *21/00*
U.S. Cl. 353—14 7 Claims



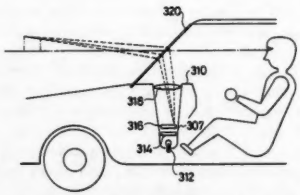
1. A display apparatus for a motor vehicle, comprising:
a projecting face provided in front of a driver's seat of the motor vehicle; and
projecting means including at least first and second display devices each having a display pattern therein, the first and second display devices being adapted to, in use, directly project the display patterns from the same direction onto the projecting face to form virtual images of the display patterns in such a manner that the virtual images overlap on an outer landscape in front of the projecting face, wherein the first and second display devices of the projecting means are arranged within the projecting means in front-to-back relationship with each other in order to produce the virtual images of the display patterns in positions different from each other in front of the projecting face, thereby providing a stereo-image indication of the projected display patterns.

4,999,012

DISPLAY APPARATUS FOR A VEHICLE

Yoshiyuki Suzuki; Kunimitsu Aoki, and Tadashi Iino, all of Susono, Japan, assignors to Yazaki Corporation, Japan

Filed Apr. 15, 1988, Ser. No. 182,292
Claims priority, application Japan, Apr. 16, 1987, 62-056667[U]; Apr. 16, 1987, 62-056668[U]; May 30, 1987, 62-082134[U]
Int. Cl.[5] G03B *21/00*
U.S. Cl. 353—14 3 Claims



1. A display apparatus for a vehicle, which comprises:
a projecting face provided in front of a driver's seat of the vehicle;
a plurality of liquid crystal devices which are spaced apart from, and overlapped with each other along an optical axis, each of the liquid crystal devices having a display pattern therein;
a light source for projecting the display patterns of the liquid crystal devices onto the projecting face to form plural virtual images of the display patterns so as to overlap on an outer landscape in front of the projecting face; and
a lens for enlarging the projected display patterns, wherein the overlapped liquid crystal devices are arranged within the focal distance of the lens in such a manner so as to provide a stereo-image of the indication of the projected display patterns.

4,999,013

CONTROLLABLE INTERFEROMETER

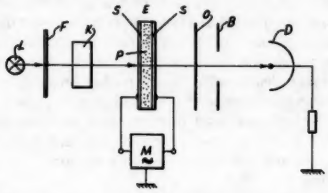
Michael Zoechbauer, Oberursel, and Walter Fabinski, Kriftel, both of Fed. Rep. of Germany, assignors to Hartmann & Braun AG, Frankfurt, Fed. Rep. of Germany

Filed Apr. 14, 1989, Ser. No. 338,723
Claims priority, application Fed. Rep. of Germany, Apr. 14, 1988, 3812334
Int. Cl.[5] G01B *9/02*
U.S. Cl. 356—346 12 Claims

1. Interferometric equipment for detecting a substance having a structure yielding a periodic or quasiperiodic absorption spectrum, the equipment including a source of radiation, a path for that radiation that includes the substance to be detected, an interference filter and a detector, the improvement comprising:
the interference filter being constructed as an electrically

tunable filter including a plate or cell element with semi-transparent reflective boundaries serving as electrodes;

means for providing an electrical voltage to said electrodes such that the transmission characteristics of the filter is varied and the amplitude of the voltage as applied to these electrodes is an indication of that variation; and



the thickness of the plate or cell providing for a distance between the interference lines as produced equaling a distance of absorption lines within a periodic absorption spectrum of said substance.

4,999,014

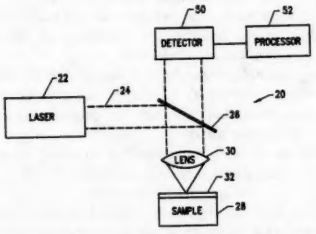
METHOD AND APPARATUS FOR MEASURING THICKNESS OF THIN FILMS

Nathan Gold, Redwood City; David L. Willenborg, Dublin; Jon Opsal, Livermore, and Allan Rosencwaig, Danville, all of Calif., assignors to Therma-Wave, Inc., Fremont, Calif.

Filed May 4, 1989, Ser. No. 347,812

Int. Cl.[5] G01B *11/06*; G01J *4/00*

U.S. Cl. 356—382 **44 Claims**



1. An apparatus for measuring the thickness of a thin film layer on the surface of a substrate comprising:

means for generating a probe beam of radiation;

means for focusing said probe beam substantially normal onto the surface of the substrate such that various rays within the focused probe beam create a spread of angles of incidence with respect to said surface;

detector means for receiving the probe beam after it has been reflected from the surface of the substrate, said detector means for measuring the intensity of various rays as a function of position with the reflected probe beam, with the position of the rays within said reflected probe beam corresponding to specific angles of incidence with respect to said surface; and

processor means for determining the thickness of the thin film layer based upon the angular dependent intensity measurements made by the detector means.

4,999,015

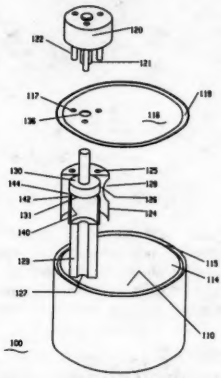
HIGH SPEED ROTATIONAL DISPERSION DEVICE USING SHORT SHEAR PATH

Elbert E. DeMaris, 405 Calderon, Mountain View, Calif. 94041

Continuation of Ser. No. 200,061, May 27, 1988, abandoned. This application Oct. 11, 1989, Ser. No. 420,641

Int. Cl.[5] B01F *5/06, 5/12*

U.S. Cl. 366—176 **45 Claims**



1. A rotational shearing device for enhancing the dispersion of agglomerates within in an input flow of carrier fluid by passing the input flow through a rotational shear gap to form an output flow in which the agglomerates are broken down by fluid shearing into the ultimate particles forming the agglomerates, comprising:

flow source means for providing the input flow of agglomerates within a carrier fluid;

stator means having a chamber therein with an input region and a shearing region, the input region having an flow input means for receiving the input flow from the flow source means and guiding the input flow to the shearing region;

stator wall means forming the shearing region of the stator means;

a shearing edge formed along the end of the stator wall means;

spinning rotor means positioned proximate the shearing region of the stator means, having an impeller surface facing the stator means and spaced from the shearing edge to form the rotational shear gap therewith;

drive means for spinning the rotor means;

stator pump formed by the impeller action of the rotor impeller surface which radially accelerates the input flow from the stator means through the shear gap which breaks the agglomerates down to the ultimate particles; and

rigid frame means with adjusting means supporting the stator means and the rotor means for establishing and maintaining the spacing of the shear gap.

4,999,016

HAND RECORDING APPARATUS

Takeshi Suzuki, and Yuji Kagami, both of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 201,839, Jun. 3, 1988, abandoned. This application Jul. 19, 1990, Ser. No. 554,166

Claims priority, application Japan, Jun. 8, 1987, 62-141506; Sep. 7, 1987, 62-221849

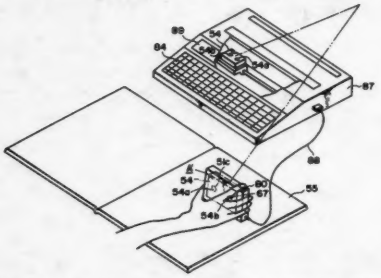
Int. Cl.[5] B41J *3/36*

U.S. Cl. 400—88 **17 Claims**

1. A hand recording apparatus for recording images on a recording medium by manual operation, said apparatus comprising:

detecting means for detecting the movement of the apparatus;

recording means driven so as to record an image conforming to an image signal on said recording medium correspondingly to the movement of said apparatus detected by said



detecting means, said recording means being shiftable between a recording position and a retracted position; and

displacing means for automatically shifting said recording means to the recording position in response to contact between said apparatus and said recording medium.

4,999,017

MULTI-COLOR WRITING UTENSIL

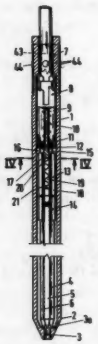
Georg Keil, Gross-Bieberau, Fed. Rep. of Germany, assignor to Firma Merz & Krell GmbH & Co., Gross-Bierberau, Fed. Rep. of Germany

Filed Feb. 15, 1990, Ser. No. 480,480

Claims priority, application Fed. Rep. of Germany, Feb. 24, 1989, 3905858

Int. Cl.[5] B43K *27/04, 21/16*

U.S. Cl. 401—32 **9 Claims**



1. A writing utensil comprising:

a shaft housing having an inner surface;

a plurality of leads within said housing, each of said leads being individually advanceable and restorable from one to another position within said housing;

a front outlet at one end of said housing through which a tip of one of said leads may protrude;

a pressure mechanism with a press element, said press element being partially outside of said shaft housing;

a press rod through which said leads can be shifted into a writing position, said press rod being located between said press element and said front outlet;

a restoring spring surrounding said press rod;

a shift rotor biased by said restoring spring;

a selector control means for bringing said press rod and one of said leads into a predetermined position, said selector control means comprising:

a plurality of receivers for holding said leads, said receivers being displaceable in a longitudinal direction;

a pusher housing loosely inserted into said shaft housing, said pusher housing having a cross-sectional size and contour shape dimensioned with respect to said inner surface permitting said pusher housing to adopt a plurality of positions defined as a function of gravity and of a rotary position of said shaft housing, each of said positions having one of said leads assigned thereto, being mounted elastically displaceable in said pusher housing, and being movable into alignment with said press rod; and

a plurality of rear head portions each assigned and connected to a respective receiver, said rear head portions being mounted non-rotatably in a section of said pusher housing.

4,999,018

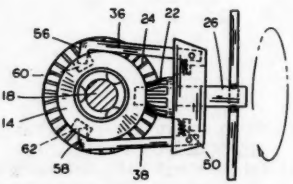
DRILL CHUCK KEY BEARING

Otto D. Wenz, Jr., Rte. 1, Box 70-A, Tekamah, Nebr. 68061

Filed Jul. 25, 1990, Ser. No. 557,947

Int. Cl.[5] B23B *31/06*

U.S. Cl. 408—241 R **6 Claims**



1. A bearing for a drill chuck key, said key of the type having a shank, a gear means at a first end of the shank for cooperation with a drill chuck, and a handle means at a second bend for rotating said shank and gear means, said chuck of the type having three equally spaced apertures therearound for receiving the first end of the key, comprising:

a support member having first and second ends, said support member having an aperture therethrough for rotatably receiving the shank of said key;

a first leg pivotally connected at one end to the first end of said support member, connected for pivotal movement within a plane that includes the longitudinal axis of the support member aperture;

a second let pivotally connected at one end to the second end of said support member, connected for pivotal movement within the pivotal plane of said first leg;

said first and second legs having their free ends bent towards one another to form generally L-shaped legs adapted to be received within opposing apertures in said drill chuck when the first end of the key is aligned with a drill chuck aperture.

4,999,019

PLASTIC PART FOR ENGAGEMENT WITH A THREADED BOLT

Willibald Kraus, Grunstadt, Fed. Rep. of Germany, assignor to TRW United-Carr GmbH & Co., Enkenbach-Alsenborn, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 271,057

Claims priority, application Fed. Rep. of Germany, Nov. 20, 1987, 3739443

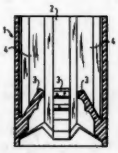
Int. Cl.[5] F16B *21/00*

U.S. Cl. 411—512 **2 Claims**

1. A plastic part for connection to a threaded bolt comprising:

a plastic body having an axially extending opening sized to axially receive a threaded bolt;

a plurality of elastic catch elements distributed about the inner circumference of the opening and extending radially inwardly of said opening to a diameter less than the diameter of a bolt received in the opening for engagement with the threads of said bolt, said catch elements provided with stepped graduations in the zone of engagement with the threads of said bolt;



guide elements extending longitudinally of the opening and distributed over the inner circumference in the interspaces between the catch elements, said guide elements being hollow and radially resilient and extending radially inward of said opening to a diameter which is located radially outward of the catch elements for guiding and centering a threaded bolt received in said opening; and,

each hollow guide element being of polygonal cross-sectional shape and located between two catch elements and extending, bu an outer wall thereof, to the adjoining side walls of the neighboring catch elements.

4,999,020

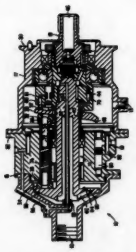
VARIABLE DISPLACEMENT HIGH PRESSURE PUMP WITH INTERNAL POWER LIMITING ARRANGEMENT

Joseph A. Stocco, Liverpool, and Howard J. Bradt, Whitesboro, both of N.Y., assignors to Lucas Aerospace Power Transmission Corp., Utica, N.Y.

Filed Nov. 30, 1989, Ser. No. 443,662

Int. Cl.[5] F04B *1/26*; F01B *13/4*

U.S. Cl. 417—222 **8 Claims**



1. A variable displacement multiple piston pump having an inlet and an outlet disposed in a housing which includes a cylinder block with a plurality of cylinders each having a pumping piston which is caused to reciprocate by a swash plate disposed in a cavity and pivotable in response to outlet pressure to vary the stroke of the pumping piston to maintain the output pressure relatively constant, the improvement comprising:

pressure compensating means disposed in the cavity in engagement with the swash plate for receiving direct feedback of the pivoted position thereof; and

the pressure compensating means being responsive to a predetermined pivoted position of the swash plate for being at a constant setting until a predetermined pump flow is achieved, whereupon the setting decreases to establish a minimum pressure at a predetermined flow for limiting pump power requirements.

4,999,021

DEVICE FOR UNLOADING CONTAINERS

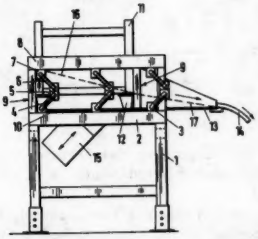
Ulrich Reissmann, Hauptstrasse 16, 3301 Gross Schweulper

Filed Oct. 10, 1989, Ser. No. 419,162

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1988, 3834339

Int. Cl.[5] B65B *21/02*

U.S. Cl. 474—415 **8 Claims**



1. A device for unloading a container loaded with bulk piece goods, which comprises:

(a) a stationary machine frame;

(b) a substantially horizontal vibrating frame which is movable with respect to said machine frame and is provided with an outlet side for unloading said bulk piece goods;

(c) means for connecting said machine frame and said vibrating frame;

(d) a receiving platform which is provided on said vibrating frame and includes means for securing said container on said receiving platform and;

(e) a low-frequency vibration drive fastened to the underside of said vibrating frame and arranged at a diagonal with respect to said substantially horizontal vibrating frame such that said vibrating frame and container are subjected to diagonal vibration pulses which direct the bulk piece goods towards said outlet side of said vibrating frame; wherein

(f) said vibration drive continuously regulates the vibration pulses in a predetermined amplitude range and limits the vibration pulses to a vertical acceleration component of about 2 g.

4,999,022

BUCKET-BLADE ATTACHMENT FOR TRACTORS

Jeff M. Veys, 123 Talkeetna Hts. Rd., Longview, Wash. 98632

Continuation of Ser. No. 58,810, Jun. 5, 1987, Pat. No. 4,854,811. This application Jul. 24, 1989, Ser. No. 384,275

The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.

Int. Cl.[5] E02F *3/34*

U.S. Cl. 414—718 **17 Claims**

1. An earth moving attachment for a tractor having a forward direction of movement and a substantially horizontal base plane on which the tractor sits, said attachment providing angular adjustment of a ground-engaging means such as a blade or bucket, the attachment comprising:

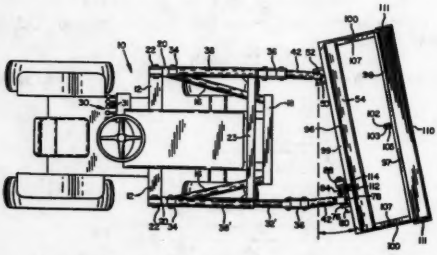
(a) a frame attached to the tractor;

(b) two generally forwardly extending arms pivotally mounted on the frame, one on each side of the tractor;

(c) means for pivoting each of the arms in a fore and aft plane;

(d) two independently telescoping members, one extending forwardly and downwardly from and supported by each of the arms;

(e) means for extending and retracting each of the telescoping members directly forwardly and rearwardly when the ground-engaging means is in a ground-engaging position,



wherein the telescoping members are extendable and retractable together or independently with respect to the arms; and

(f) forward ground-engaging means entirely supported by the telescoping members and attached to the telescoping members by joint means for allowing the ground-engaging means to skew in a generally horizontal plane when one telescoping member is extended further than the other.

4,999,023

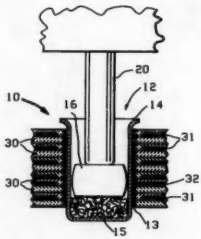
HIGH DENSITY LOW REACTANCE SOCKET

Philip P. Froloff, Escondido, Calif., assignor to Unisys Corporation, Blue Bell, Pa.

Filed Nov. 14, 1989, Ser. No. 436,397

Int. Cl.[5] H01R *9/09*

U.S. Cl. 439—68 **11 Claims**



1. A socket for an electronic component, which is comprised of:

an electrically insulative base having a substantially planar surface;

said base having a plurality of elongated holes that extend from said surface into said base;

electrical signal paths integrated into said base which are exposed on sidewalls said holes;

each of said holes containing a respective electrically conductive spring and an electrically conductive piston which rests on said spring; and,

each spring being a sponge-like mass which is forced against a respective one of said electrical signal paths in response to being compressed in the direction of elongation by terminals on said component.

4,999,024

LEATHER TANNING PROCESS

Hansjoerg Scheen, 1710 Country Club Dr., Redlands, Calif. 92372

Continuation of Ser. No. 290,177, Dec. 23, 1988, abandoned.
This application Jul. 9, 1990, Ser. No. 549,541
Int. Cl.[5] C14C *3/02, 3/04*
U.S. Cl. 8—94.26 15 Claims

1. A leather tanning process comprising the steps of:

pretreating animal skins having a natural substantially closed pore structure, said pretreating step including immersing the skins in a bath containing a lubricating solution under time and temperature conditions to result in substantial opening of the pore structure of the animal skins and absorption of a substantial quantity of the lubricating solution into the pores structure of the animal skins;

subjecting the pretreated skins to a bating process comprising:

(a) tumbling said pretreated skins in an initial bating bath comprising a mild acid solution;

(b) removing said pretreated skins from said initial bating bath;

(c) rinsing said pretreated skins in water;

(d) tumbling said pretreated skins in an enzyme-containing aqueous bath; and

(e) rinsing said pretreated skins to substantially close the pore structure to seal in the absorbed lubricating solution; and

tanning the bated skins to produce leather having the lubricating solution absorbed therein.

4,999,025

VISCOSITY-MODIFIERS FOR AQUEOUS-BASED DYE-DEPLETION PRODUCTS

Robert T. Patton, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jun. 27, 1988, Ser. No. 212,403
Int. Cl.[5] D06L *3/02, 3/04*
U.S. Cl. 8—111 20 Claims

1. A method for dye-depletion of a material, selected from the group consisting of cloth, fabric, leather, wood, paper and other pulp product said method comprising contacting the material with an aqueous-based dye-depletion reagent in a manner, and for a period of time, whereby at least a portion of the material is affected by the dye-depletion reagent as evidenced by a change of color in the area in which the dye-depletion reagent is brought into contact with the material,

said dye-depletion reagent being thickened or viscosity-modified by the presence therein of an effective amount of at least one monodisperse, monolayer, crystalline mixed metal hydroxide compound conforming essentially to the formula

$$Li_mD_dT(OH)_{(m+2d+3+n\cdot a)}(A^n)_a\cdot xH_2O$$

where

m is from zero to one,

D is a divalent metal and d represents the amount of D,

T is at least one trivalent metal,

A represents at least one monovalent or polyvalent anion or negative-valence radical,

a is an amount of A ions of valence n, with n·a being an amount of from about zero to about −3,

(m+2d+3+n·a) is equal to or more than 3,

(m+d) is greater than zero, and

xH_2O represents excess waters of hydration, with x being zero or more,

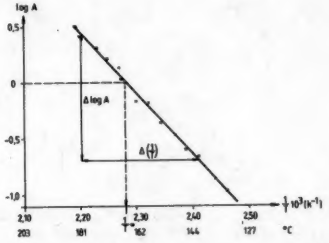
said reagent being characterized by being a thickened product which thins readily under shear, but which gels essentially immediately when shear is stopped.

4,999,026

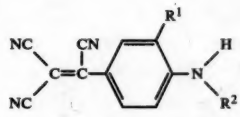
TRANSFERRING DYES FOR THERMAL PRINTING: TRI-CYANO-VINYL ANILINE DYES

Bernhard Albert, Maxdorf; Karl-Heinz Etzbach, Frankenthal, and Ruediger Sens, Mannheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Continuation of Ser. No. 228,874, Aug. 5, 1988, abandoned, which is a continuation of Ser. No. 89,542, Aug. 26, 1987, abandoned. This application Jul. 24, 1989, Ser. No. 384,095
Claims priority, application Fed. Rep. of Germany, Sep. 5, 1986, 3630279
Int. Cl.[5] B41M *5/26;* C09B *23/14, 29/03*
U.S. Cl. 8—471 6 Claims



1. A process for transferring a dye from a carrier by sublimation/vaporization with the aid of a thermal printing head to a plastic-coated paper, said carrier employing a dye of the formula:



wherein R^1 is C_1–C_4-alkoxy, and R^1 is phenyl which is unsubstituted or substituted by methyl or methoxy, or is C_1–C_6-alkyl which is unsubstituted or substituted by C_1–C_4-alkoxy, C_1–C_4-alkoxycarbonyl, C_2–C_5-alkanoyloxy, C_1–C_4-alkoxycarbonyloxy, C_1–C_4-alkoxy-C_2- or C_3-alkoxycarbonyl, hydroxyl or cyano.

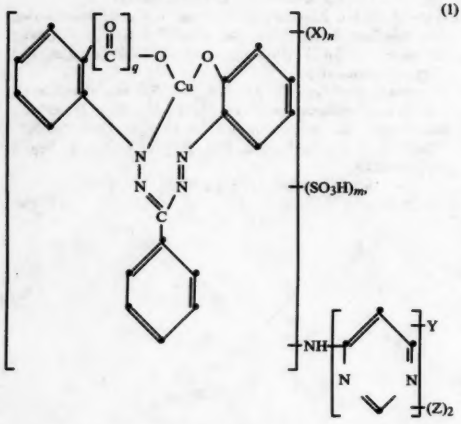
4,999,027

PROCESS FOR TRICHROMATIC DYEING OR PRINTING

Urs Lehmann, and Karl Hoegerle, both of Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

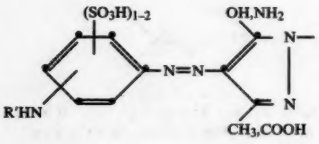
Filed Aug. 23, 1989, Ser. No. 398,118
Claims priority, application Switzerland, Aug. 26, 1988, 3172/88
Int. Cl.[5] C09B *45/00, 50/00;* D06P *3/24, 3/10*
U.S. Cl. 8—543 18 Claims

1. A process for the trichromatic dyeing or printing of natural and synthetic polyamide fibre material by means of mixtures of reactive dyes, which comprises treating these fibre materials with a dye liquor or printing paste which contains a blue-dyeing reactive dye of the formula

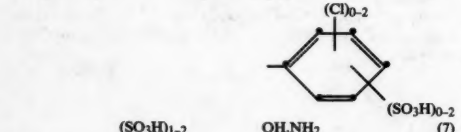


(1)

in which X is halogen, C_1–C_4alkyl, C_1–C_4alkoxy, cyano or nitro, n is the number 0, 1 or 2, q is the number 0 or 1, m is the number 1, 2 or 3, Z is halogen and Y is a CN, CHO or $S(O)_pR$ group in which p is the number 0, 1 or 2 and R is phenyl or C_1–C_8alkyl which is unsubstituted or substituted by halogen or phenyl, together with at least one yellow- or orange-dyeing sulfo-containing reactive dye of the formulae



(6)



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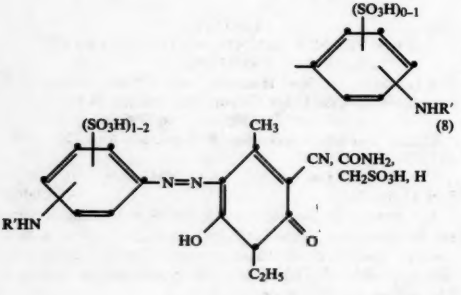

(8)

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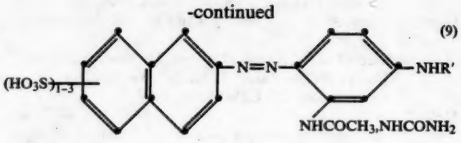
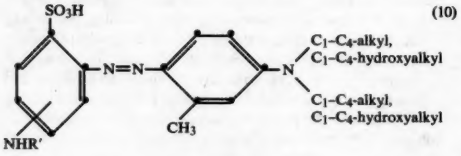


(9)



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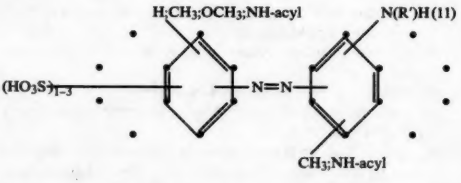
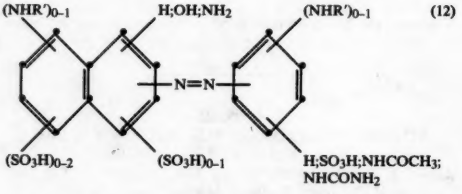
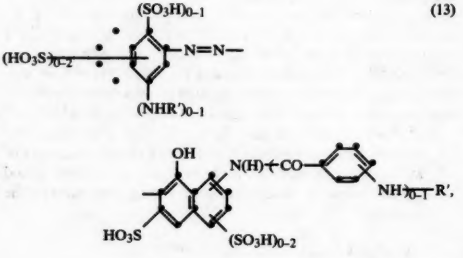


(11)

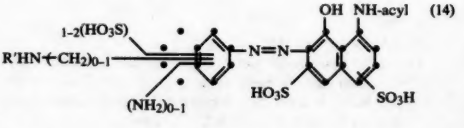


(12)

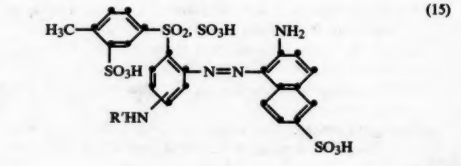
and at least one red-dyeing sulfo-containing reactive dye of the formulae



(13)



(14)



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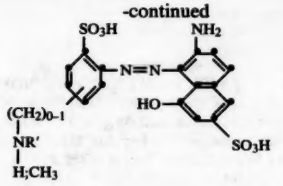


(16)

in which acyl is acetyl or benzoyl, R' is difluorochloropyrimidinyl, α,β-dihalogenopropionyl or α-halogenoacryloyl, and the fused rings indicated by dots represent naphthalene systems which are a possible alternative.

4,999,028

Patent Not Issued For This Number

4,999,029

PREPARATION OF SYNTHESIS GAS BY PARTIAL OXIDATION

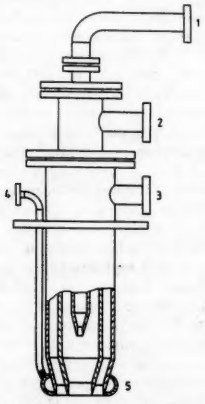
Gero Lueth, Mannheim; Rolf Becker, Weinheim; Robert K. Horn, Ludwigshafen; Uwe Kempe, Dannstadt-Schauernheim, and Wolfgang Vodrazka, Freinsheim, all of Fed. Rep. of Germany, assignors to Pasf Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 8, 1990, Ser. No. 462,000

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1989, 3902773

Int. Cl.[5] C10J *3/16*

U.S. Cl. 48—197 R **8 Claims**



1. In a process for the preparation of a synthesis gas by partial autothermal oxidation of a liquid or solid fuel in the presence of oxygen or an oxygen-containing gas with the addition of a gaseous temperature moderator selected from the group consisting of steam and CO_2 and mixtures thereof, in an empty reactor space without baffles, at from 1000° to 1500° C. under from 1 to 100 bar, the improvement which comprises:

feeding said fuel and oxygen-containing gas separately via feed pipes through concentrically arranged orifices opening into the reactor while feeding in the moderator gas simultaneously with the feed of the fuel and letting down the pressure of said moderator gas through one or more nozzles into the fuel stream at a point flush with or directly before the orifice for the fuel, said let-down being effected at from 30 to 250%, of the critical pressure ratio of said moderator gas.

4,999,030

PROCESS FOR PRODUCING A METHANE-CONTAINING FUEL GAS

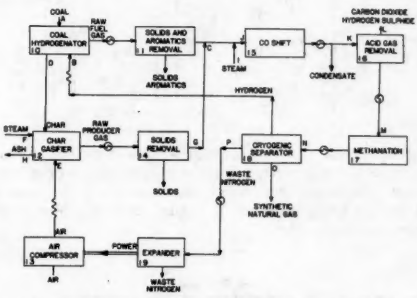
Geoffrey F. Skinner, Reading, and Wieslaw M. Kowal, Henley, both of England, assignors to Foster Wheeler USA Corporation, Clinton, N.J.

Continuation of Ser. No. 162,821, Mar. 2, 1988, abandoned. This application Jan. 22, 1990, Ser. No. 467,343

Claims priority, application United Kingdom, Mar. 6, 1987, 8705275

Int. Cl.[5] C10J *3/00*

U.S. Cl. 48—197 R **5 Claims**



1. A process for the production of a methane-containing fuel gas which includes the steps of:

(a) hydrogenating a first liquid hydrocarbon or solid carbonaceous material in the presence of recycled hydrogen to produce a raw fuel gas stream comprising methane and unreacted hydrogen,

(b) gasifying a second liquid hydrocarbon or solid carbonaceous material in the presence of air to produce a second gas stream comprising hydrogen, nitrogen and carbon oxides,

(c) removing solids from said gas streams,

(d) mixing said second gas stream with said raw fuel gas stream and with steam and subjecting the resulting product stream to carbon monoxide shift conditions to convert at least a portion of the carbon monoxide present in said carbon oxides to carbon dioxide with generation of hydrogen,

(e) removing at least a portion of the carbon dioxide and other acid gas from said product stream,

(f) reacting the hydrogen in said product stream with carbon oxides present in said product stream to generate methane,

(g) subjecting said product stream to cryogenic separation to yield at least a nitrogen-rich stream, a recycle hydrogen stream, and a methane-containing fuel gas, and

(h) recycling said recycle hydrogen stream to step (a) to hydrogenate said first liquid hydrocarbon or solid carbonaceous material.

4,999,031

REMOVING CO_2 AND, IF NECESSARY, H_2S FROM GASES

Wolfgang Gerhardt, Gruenstadt, and Werner Hefner, Lampertheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 11, 1989, Ser. No. 392,410

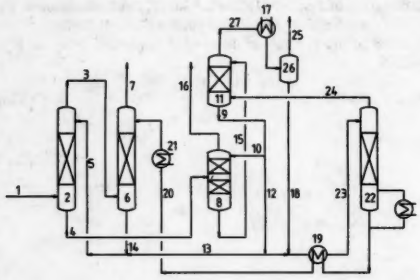
Claims priority, application Fed. Rep. of Germany, Aug. 19, 1988, 3828227

Int. Cl.[5] B01D *47/00*

U.S. Cl. 55—43 **10 Claims**

1. A process for removing CO_2 and, if present, H_2S, from a gas containing CO_2 by contact with an absorption liquid which comprises: treating the gas containing CO_2 with the absorption liquid in an absorption zone; regenerating the absorption liquid

which is obtained from the absorption zone and which is laden with CO_2 by reducing the pressure of the CO_2-laden liquid in two to four let-down stages; taking off a gas containing CO_2 at the top of one or more of the let-down stages; recycling the regenerated absorption liquid from one or more of the said



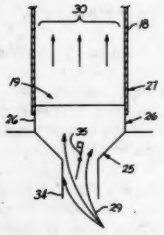
let-down stages to the absorption zone and feeding a bleed stream of said regenerated absorption liquid to one or more of the let-down stages from which a gas containing CO_2 is taken off, the gas being taken off at a point above the feed of the absorption liquid therein.

4,999,032

REDUCING ATMOSPHERIC POLLUTION BY AUTOMATIC PROCESSING OF LEAKING FILTER BAGS IN A BAGHOUSE NETWORK

Wade Wright, 4113 72nd. Ave., Hyattsville, Md. 20784

Filed Apr. 30, 1990, Ser. No. 516,846
Int. Cl.[5] B01D *46/02*
U.S. Cl. 55—97 **17 Claims**



1. An improved automatic fabric bag filtering network protection system for eliminating pollution to the atmosphere caused by failure of individual filter bags in the network, comprising in combination,

a plurality of filter bag mounting assemblies arranged in said system to receive a stream of a polluted fluid, such as air, therethrough in parallel at predetermined pressure so that the failure of each filter bag can permit passage of the fluid without filtering and can affect the pressure of the flow in the system by removal of filter resistance,

individual control valve assemblies controlling the flow of the fluid through individual filter bags arranged in the flow path through the bags for uniformly closing off the flow to filter bags when the flow exceeds a threshold flow magnitude that indicates failure of the filter bag,

valve assembly means having valving structure comprising a fluid flow closure flap with a plate member pivotable about a pivot axis located off center in the plate member, and

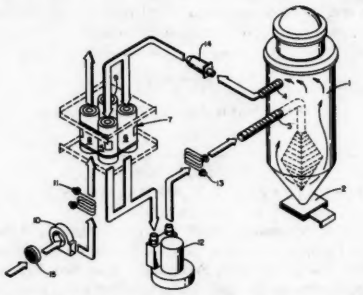
mounting means placing the closure flap within an isolated fluid flow path for an individual bag in a position avoiding substantial turbulence so that the plate responds to the fluid flow as a pivoting force to close the flow path in response to flow rates in said bag of a magnitude exceeding said threshold flow.

4,999,033

INTEGRALLY VALVED, LOW FRICTION INDEXING DESICCANT BED DEHUMIDIFIER

Robert E. Roberts, Columbus, and Wayne E. Caudle, Johnstown, both of Ohio, assignors to Bry-Air, Inc., Sunbury, Ohio

Filed May 31, 1989, Ser. No. 359,387
Int. Cl.[5] B01D *53/06*
U.S. Cl. 55—181 **7 Claims**



1. In a dehumidifying apparatus in which a desiccant medium is cyclically shifted between an operating active process condition, a regenerating condition, and a cooling condition, the improvement comprising:

(1) a rotatable desiccant bed having a plurality of essentially identical modular desiccant containers being disposed substantially parallel to a central bed axis, each of said containers containing a desiccant medium and having a pair of air permeable surfaces situated on each end of said containers which permit the flow of air from one side of a container to the other side through the desiccant and sealing means on each end of each container;

(2) two fixed parallel low friction sealing plates cooperatively engageable with the sealing means on each end of each desiccant container in said bed, having a plurality of apertures to provide a first isolated class of air process containers in which the bed desiccant is active, a second isolated class of containers in which the bed desiccant is in a regenerating condition, and a third isolated class of containers in which the bed desiccant is in a cooling condition after it has been regenerated and prior to the time it is in active process such that each desiccant container in said bed only in the process and regeneration stage has associated with it a pair of apertures in said sealing plates, and each desiccant container in said bed in the cooling stage is not associated with any apertures in said plates, whereby heat dissipates independently of forced air flow through said desiccant container in the cooling stage, said sealing plates;

(a) being operatively disposed with respect to connections with the process and regeneration air flows to define separate process or regeneration sections in the apparatus for the counter flow of air through the beds in each respective class of containers; and

(b) being further operatively disposed with respect to said seals on the ends of each desiccant container so as to provide continuous sealing of said containers such that rotation of said bed a predetermined angular segment of a circle permits sealed cyclical process, regeneration, and cooling conditions to occur; and

(3) motor means for intermittently rotating said bed with respect to said fixed sealing plates about a predetermined angular segment around the axis of said bed a predetermined time interval to shift a desiccant container in the

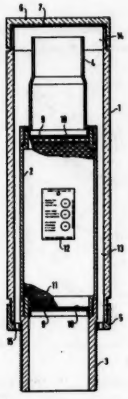
first class of active air process containers to the regenerating condition, and then to the cooling condition, and then again to the active condition.

4,999,034

DESICCANT CARTRIDGE

Peter Mager, and Willi Schenkel, both of Cologne, Fed. Rep. of Germany, assignors to Süd-Chemie Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jan. 31, 1990, Ser. No. 472,711
Int. Cl.[5] B01D *19/00*
U.S. Cl. 55—275 **16 Claims**



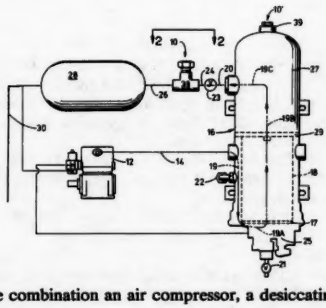
1. A desiccant cartridge for connection to a container which contains moisture-sensitive products wherein said desiccant cartridge is comprised of a cartridge casing having a dessicant, means for retaining the desiccant and having at least two openings for the passage of air, one opening (a) being connected to the container, the other opening (b) being connected to the cartridge casing and communicating with the outside air by means of an outer casing which forms an air duct which completely surrounds the cartridge casing wherein said air-duct forms a diffusion path the length of which is at least eight-times greater than the square root of the breathing cross-sectional area of the desiccant cartridge.

4,999,035

INDICATOR DEVICE FOR COMPRESSED AIR SYSTEMS

Eugene R. Warndorf, Ft. Thomas, Ky., assignor to American Dry Air Products Company, Inc., Ft. Thomas, Ky.

Filed Jan. 13, 1989, Ser. No. 297,114
Int. Cl.[5] B01D *19/00*
U.S. Cl. 55—275 **15 Claims**



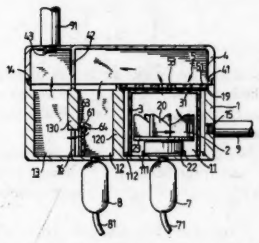
1. The combination an air compressor, a desiccating tower receiving compressed air from the compressor, a storage tank, first line means connecting the desiccating tower to the storage tank, and second line means connecting the storage tank to the compressor with an upright fitting connected to the first line means downstream of desiccant in the desiccating tower, an indicator device connected to the upright fitting, a hollow indicator body mounted on the upright fitting with a bore in the upright fitting in communication with the hollow interior of the hollow body, an end portion of the hollow interior of the body being exposed, a transparent plate closing the exposed end portion, means for holding the transparent plate in position closing the exposed end portion, a chamber being formed in the hollow interior of the body portion, and a humidity sensitive indicator pad in the chamber visible through the transparent plate.

4,999,036

FILTERING DEVICE FOR REMOVING LIQUID PARTICLES FROM AIR STREAMS OF AIR COMPRESSORS

Ming Y. Hwang, and So Y. Lin, both of No. 67, Ta Hsin St., Tainan, Taiwan

Filed Apr. 26, 1990, Ser. No. 514,946
Int. Cl.[5] B01D *50/00*
U.S. Cl. 55—317 **7 Claims**



1. A filtering device for removing liquid particles from air streams of air compressors comprising a housing with an open side of which the interior is divided by a first partition and a second partition into three successive compartments, a first one, a second one, and a third one with the first partition sandwiched between the first and the second compartments and the second partition sandwiched between the second and the third compartments, a lid with an interior space which covers the open side of said housing and seals thereon by suitable sealing means, a vane-type impeller which is rotatably disposed in the first compartment, a perforated cover with an air stream hole completely covering said vane-type impeller, a first filter layer disposed in an air passage between the first and the second compartments to remove liquid from air streams when they follow from the first compartment to the second compartment, a second filter layer disposed in an air passage between the second and the third compartments to further remove liquid from the air streams when they go on following into the third compartment, a plurality of liquid reservoirs which are in fluid connection with said housing to receive the liquid removed from the air streams therein and drain the liquid off with a drain line connected thereto, an air inlet which is formed on said housing so as to provide a fluid connection between the first compartment and an air supply conduit which is connected to an air compressor, and an air outlet which is in fluid connection to the third compartment and an air exhaust conduit so that air is exhaustible from the third compartment, said air stream hole being so formed on said perforated cover that when pressurized air coming from said air supply conduit passes through said air stream hole, the pressureized air stream will hit said vane-type impeller eccentrically and rotated said vane-type impeller so as to create circulation of air inside said perforated cover which will remove liquid particles from air due to centrifugal force and

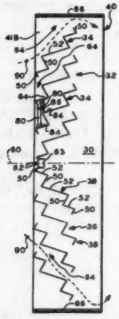
leave liquid particles on the inside surface of said perforated cover.

4,999,037

LOUVER ASSEMBLY

Charles W. Albritton, Hermitage, and Charles D. Reagle, Mercer, both of Pa., assignors to FL Industries Inc., Livingston, N.J.

Filed Feb. 8, 1990, Ser. No. 477,292
Int. Cl.[5] B01D *45/08*
U.S. Cl. 55—385.1 **9 Claims**



1. A louver assembly for the air intake of an enclosure, the interior of which is maintained at a negative pressure by a fan therewithin so that air is drawn through the louver assembly; the louver assembly comprising:

a first plurality of spaced vanes defining passageways therebetween, each vane being free of discontinuities and being formed by simple bending of a planar member and including

a plurality of first mutually parallel, planar segments, and

a plurality of second, mutually parallel, planar segments which include with the first segments an angle, of between about 70° to about 90° each second segment respectively interconnecting two serial first segments so that the vanes assume a stair-step-like cross-section;

a second plurality of spaced vanes formed and configured as the first plurality of vanes; and

means for mounting the vanes in the air intake so that, when the vanes are viewed end-on

(a) the vanes extend in the direction of air flow and away from the location of air entry into the assembly;

(b) the first plurality of vanes has a mirror image relationship with the second plurality of vanes relative to an axis of symmetry of the assembly;

(c) the free edges of the first planar segments of the vanes in the first and second pluralities of vanes closest to the axis are closely spaced; and

(d) the passageways between adjacent vanes are generally directed away from both the axis and the location of air entry into the assembly.

4,999,038

FILTER UNIT

Bo E. H. Lundberg, Heroes de Padierna No. 111, Col. San. Jeromino Lidice, Mexico City 10200, Mexico

Filed Feb. 7, 1989, Ser. No. 307,609
Int. Cl.[5] B01D *29/00, 39/00*
U.S. Cl. 55—491 **20 Claims**

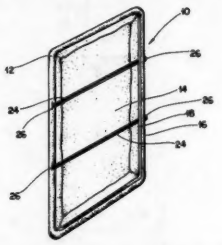
1. A filter unit comprising:

first and second similarly and complementary shaped frame means;

said first frame means including a frame for mounting a stretchable sheet of filtering material, said first frame being a quadrangularly-shaped closed member having a circular cross-section;

said stretchable sheet of filtering material being sized larger than said first frame and having a central portion for filtration and a marginal portion surrounding said central portion for peripherally sealing the filter unit, said marginal portion being folded over said quadrangularly-shaped closed member and doubled over said central portion;

said second frame means also being a quadrangularly-shaped closed member having a circular cross-section receivable within and below said first frame and against said marginal portion of said sheet of filtering material for stretching thereof and for bearing against said marginal portion thereof such that said sheet of filtering material is tightly held solely between said first and said second frames and said marginal portion of said sheet of filtering material



preventing air leaks between said first and said second frame means; and

mechanical interconnection means extending from said second frame means, said mechanical interconnection means including at least one pair of oppositely disposed ear members extending from a peripheral outer surface of said closed member of said second frame for penetrating through said marginal portion of said sheet of filtering material at, at least one pair of opposite locations adjacent said first and said second frame means and contacting the outer periphery of a peripheral outer surface of a side of said first frame so that said first frame means is held between at least said one pair of said ear members for reinforcing said first frame means by said second frame means, and said ear members conjointly with said first and said second frames preventing slippage of said sheet of filtering material from said first and said second frame means.

4,999,039

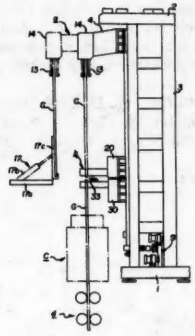
METHOD AND APPARATUS FOR MANUFACTURE OF THIN SHEET GLASS

Hideyuki Itoi, Chigasaki; Ryoji Yoshimura, Otsu, and Tsuneo Kaizuka, Suita, all of Japan, assignors to Nippon Electric Glass Co., Ltd., Siga, Japan

PCT No. PCT/JP88/00188, § 371 Date Oct. 17, 1989, § 102(e) Date Oct. 17, 1989, PCT Pub. No. WO89/07580, PCT Pub. Date Aug. 24, 1989
PCT Filed Feb. 22, 1988, Ser. No. 425,209
Int. Cl.[5] C03B *23/02, 23/037*
U.S. Cl. 65—54 **3 Claims**

1. A method for manufacturing thin sheet glass comprising the steps of: heating and fusing the front end of a first material

sheet of glass to the rear end of a second material sheet of glass, and sequentially heating the fused second and first material



sheets of glass above the softening temperature of the glass and drawing the second and first sheets of glass.

4,999,040

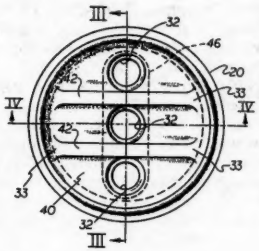
GLASSWARE FORMING MACHINE

Michael J. Stankosky, Windsor, Conn., assignor to Emhart Industries, Inc., Towson, Md.

Continuation of Ser. No. 73,540, Jul. 10, 1987, abandoned. This application Nov. 2, 1989, Ser. No. 418,766

Int. Cl.[5] C03B *7/088*

U.S. Cl. 65—325 **3 Claims**



1. A glass feeder comprising

a spout bowl assembly for containing molten glass including

a spout bowl and

a refractory orifice ring at the bottom of said spout bowl having a plurality of discharge holes defined therein through which runners of molten glass may flow,

means for controlling the volume of the runners flowing through said orifice ring discharge holes,

said refractory orifice ring including

an annular side wall

a planar bottom wall

a discrete number of ribs defined in said bottom wall and extending between each pair of said discharge holes and merging into said annular side wall at selected locations equidistant from each pair of said holes, said ribs being "V" shaped in cross-section to receive cooling tubes, and

said bottom wall joined to said annular side wall and having an increased thickness around the periphery of each of said discharge holes and a uniform thickness at all locations except at said ribs and said increased thickness,

the cross-section of said annular side wall taken at any radial location around the ring having the same cross-section as the cross-section taken at any other radial location except where said ribs merge into said side wall.

4,999,041

USE OF DIPHENYL ETHER DERIVATIVES FOR THE DESICCATION AND ABSCISSION OF PLANT ORGANS

Klaus Grossmann, Limburgerhof, Fed. Rep. of Germany; Helmut Walter, Greenville, Miss., and Bruno Wuerzer, Otterstadt, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

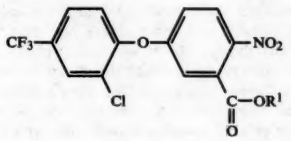
Filed Dec. 18, 1989, Ser. No. 452,108

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1989, 3926055

Int. Cl.[3] A01N *33/22, 37/38*

U.S. Cl. 71—70 **3 Claims**

1. A method of effecting desiccation and abscission of plant organs which comprises administering to the plants or their habitats a desiccation- and abscission- effective amount of a compound of the formula:



wherein R^1 is hydrogen, an alkali metal or alkaline earth metal ion, substituted or unsubstituted ammonium, alkyl of 1 to 4 carbon atoms, or alkoxycarbonylalkyl having a total of 1 to 6 carbon atoms.

4,999,042

PHENYL OXIMINO-ACETATE FUNGICIDES

Vivienne M. Anthony, Maidenhead; John M. Clough, Marlow; Christopher R. A. Godfrey, and Thomas E. Wiggins, both of Brachnell, all of England, assignors to Imperial Chemical Industries PLC, London, England

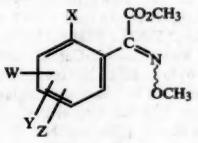
Continuation of Ser. No. 382,058, Jul. 14, 1989, which is a continuation of Ser. No. 69,702, Jun. 30, 1987, abandoned. This application Dec. 19, 1989, Ser. No. 452,333

Claims priority, application United Kingdom, Jul. 18, 1986, 8617648

Int. Cl.[5] A01N *37/10*; A61K *31/24*; C07C *251/48*

U.S. Cl. 71—88 **8 Claims**

1. A compound having the general formula (I):



(I)

and stereoisomers thereof, wherein X is cycloalkyl, aralkyl in which the alkyl moiety is optionally substituted with hydroxy or C_{1-4} alkoxy, aryloxyalkyl in which the alkyl moiety is optionally substituted with methoxy, alkenyl, optionally substituted with phenyl, furyl, thienyl or pyridyl, alkynyl optionally substituted with phenyl, aryl, amino optionally substituted with aryl or alkyl, arylazo in which the aryl moiety is optionally substituted with alkynyl, alkoxy or dialkyl-amino, heteroarylalkyl, heteroaryloxyalkyl, acylamino in which the amino group is optionally substituted with alkyl, nitrilo, trifluoromethyl, -OR', SR', $-CO_2R^2$, $-CONR^3R^4$, $-COR^5$, $-CR^6{=}NR^7$, $-N{=}CR8R^9$, $-SOR^{10}$ or $-SO_2R^{11}$; W, Y and Z, which may be the same or different, are any of the atoms or groups listed for X above and, in addition, may be hydrogen or halogen atoms or alkyl, alkoxy, alkylthio or nitro; or any two of the groups W, X, Y and Z, in adjacent positions on the phenyl ring, optionally join to form a fused ring, either aromatic or aliphatic, optionally containing one or more heteroatoms; R' is cycloalkyl

optionally containing a heteratom in the cycloalkyl ring, alkenyl optionally substituted as alkenyl above, acyl, aryl, heteroaryl, aralkyl optionally substituted as aralkyl above or heteroarylalkyl; R^2, R^3, R^4, R^5, R^6, R^8, R^9, R^{10} and R^{11}, which may be the same or different, are hydrogen or alkyl, cycloalkyl, cycloalkylalkyl, alkenyl optionally substituted as alkenyl above, aralkyl optionally substituted as aralkyl above, aryl or heteroaryl; and R^7 is aryl; except where otherwise stated, any foregoing alkyl group or moiety being optionally substituted with hydroxy, halogen or alkoxycarbonyl and any foregoing aryl or heteroaryl group or moiety being optionally substituted with one or more of halogen, hydroxy, C_{1-4} alkyl, C_{1-4} alkoxy, trifluoromethyl, trifluoromethoxy, phenoxy, benzyloxy, nitro, amino, phenyl, carboxy or carboxylic acid ester, cyano, alkylcarbonylamino or methylenedioxy, the phenoxy and benzyloxy groups being optionally substituted with any of those other substituents which may be present on aryl groups or moieties provided that when W, Y and Z are independently hydrogen, or alkyl X is not phenylalkyl, phenoxyalkyl, phenylalkenyl, phenylalkynyl, OR′ in which R′ is phenyl or phenylalkyl, or any such group in which the phenyl moiety is substituted with halogen, C_{1-4} alkyl, C_{1-4} alkoxy, trifluoromethyl, unsubstituted or halo or alkyl substituted phenoxy, unsubstituted or halo or alkyl substituted benzyloxy, nitro, phenyl or cyano.

7. A method of combating fungi, which comprises applying to a plant, to a seed of a plant, or to the locus of the plant or seed, a fungicidally effective amount of a compound as defined in claim 1.

8. A method of regulating plant growth which comprises applying to a plant, to a seed of a plant or to the locus of the plant or seed, an effective amount of a compound as defined in claim 1.

4,999,043

TRIAZOLYLMETHYL TERT-BUTYL CARBINOL DERIVATIVES WHICH HAVE PLANT GROWTH REGULATING PROPERTIES

Raymond Elliott, Nr. Reading; John Dalziel, Binfield, and Raymond L. Sunley, Twyford, all of England, assignors to Imperial Chemical Industries PLC, London, England

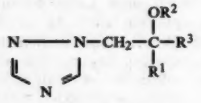
Continuation of Ser. No. 892,363, Aug. 4, 1986, abandoned. This application Feb. 6, 1989, Ser. No. 307,174

Claims priority, application United Kingdom, Aug. 7, 1985, 8519843; Feb. 18, 1986, 8603952

Int. Cl.[5] A01N *43/653*; C07D *249/08*

U.S. Cl. 71—92 **5 Claims**

1. A triazole derivative having the formula (I)



and stereoisomers thereof, wherein R^1 is an alkyl group containing from 4 to 9 carbon atoms, or a haloalkyl group containing from 3 to 8 carbon atoms; R^2 is hydrogen; and R^3 is a tertiary butyl group optionally substituted by halogen; and acid addition salts, and metal complexes of the compound of formula (I) wherein R^2 is hydrogen.

4,999,044

HETEROCYCLIC SULFONAMIDES

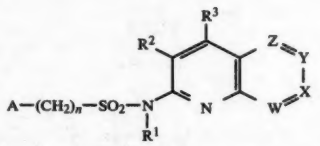
Thomas Saupe, Bammental; Gerhard Kiebe; Ulrich Schirmer, both of Heidelberg; Gerhard Paul, Ludwigshafen; Reiner Kober, Fussgoenheim; Bruno Wuerzer, Otterstadt; Rainer Berghaus, Mutterstadt; Norbert Meyer, Ladenburg, and Karl-Otto Westphalen, Speyer, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 310,753, Feb. 15, 1989, Pat. No. 4,881,969. This application Jul. 12, 1989, Ser. No. 378,986

Int. Cl.[5] A01N *43/48*; C07D *237/30*

U.S. Cl. 71—92 **6 Claims**

1. A sulfonamide of the formula I



I

where the substituents and indices are defined as follows:

R^1 is hydrogen, cyano,

C_1–C_8-alkyl which may be substituted by one of the following radicals: C_1–C_2-alkoxy, C_1–C_2-alkylthio, aryl, aryloxy, arylthio, hetaryl, hetaryloxy and hetarylthio,

C_2–C_5-alkenyl,

C_2–C_4-alkynyl,

$COR^4$where R^4 is C_1–C_4-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, aryl, aryloxy, arylthio, aryl-C_1–C_4-alkoxy, hetaryl, hetaryloxy, hetarylthio or hetaryl-C_1–C_4-alkoxy,

$CONR^5R^6$, where R^5 and R^6 are identical or different and each denotes hydrogen, C_1–C_4-alkyl, C_3–C_6-cycloalkyl, C_2–C_5-alkenyl, aryl, hetaryl, aryl-C_1–C_4-alkyl, hetaryl-C_1–C_4-alkyl or C_1–C_4-alkylcarbonyl or together denote a C_2–C_6-alkylene chain,

or SO_mR^4, where m is 1 or 2 and R^4 is as defined above;

R^2, R^3 are identical or different and each denotes nitro, hydroxy, carboxy, mercapto or halogen,

C_1–C_4-alkyl, which may be monosubstituted by hydroxl, mercapto, amino, aryloxy or hetaryloxy and/or monosubstituted, disubstituted or trisubstituted by halogen,

C_3–C_6-cycloalkyl, which may be monosubstituted, disubstituted or trisubstituted by halogen, hydroxyl, mercapto and/or C_1–C_4-alkyl,

C_3–C_6-cycloalkoxy,

C_3–C_6-cycloalkylthio,

C_2–C_5-haloalkenyl,

C_2–C_4-haloalkynyl,

C_1–C_4-alkoxy, which may be monosubstituted, disubstituted or trisubstituted by halogen and/or monosubstituted by aryl or hetaryl,

C_1–C_4-alkylthio, which may be monosubstituted, disubstituted or trisubstituted by halogen and/or monosubstituted by aryl or hetaryl,

C_2–C_5-alkenyloxy,

C_2–C_4-alkynyloxy,

$—NR^5R^6$, where R^5 and R^6 are each as defined above, or one of the groups mentioned under R^1,

W and X are each nitrogen,

Y and Z each denote a group of the formula

where R^7 is hydrozino or one of the groups mentioned under R^2,

n is 0 or 1 and

A is aryl or hetaryl, which each may carry from one to five halogen atoms and/or from one to three of the following substituents:

—SO_2R^8, where R^8 is hydroxy, C_1–C_4-alkoxy, aryl-C_1–C_4-alkoxy, aryloxy, hetaryloxy, hetaryl-C_1–C_4-alkoxy or —NR^5R^6, where R^5 and R^6 are each as defined above, and/or

the groups mentioned under R^2,

wherein the term aryl defines phenyl or naphthyl and the term hetaryl defined monocyclylic or bicyclylic 5- and 6-membered rings said monocyclyl or bicyclyl containing one or more heteroatoms, and the salts and N-oxides thereof.

4,999,045

HETEROCYCLIC SULFONAMIDES

Thomas Saupe, Bammental; Gerhard Klebe; Ulrich Schirmer, both of Heidelberg; Gerhard Paul, Ludwigshafen; Reiner Kober, Fussgoenheim; Bruno Wuerzer, Otterstadt; Rainer Berghaus, Mutterstadt; Norbert Meyer, Ladenburg, and Karl-Otto Westphalen, Speyer, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

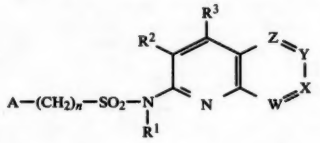
Division of Ser. No. 310,753, Feb. 15, 1989, Pat. No. 4,881,969. This application Jul. 12, 1989, Ser. No. 378,985

Claims priority, application Fed. Rep. of Germany, Feb. 28, 1988, 3804990

Int. Cl.[5] A01N *43/48*; C07D *471/00*

U.S. Cl. 71—92 **6 Claims**

1. A sulfonamide of the formula I



I

where the substituents and indices are defined as follows:

R^1 is hydrogen, cyano,

C_1–C_8-alkyl which may be substituted by one of the following radicals: C_1–C_2-alkoxy, C_1–C_2-alkylthio, aryl, aryloxy, arylthio, hetaryl, hetaryloxy and hetarylthion,

C_2–C_5-alkenyl,

C_2–C_4-alkynyl,

COR^4, where R^4 is C_1–C_4-alkyl, C_1–C_4-alkoxy, C_1–C_4-alkylthio, aryl, aryloxy, arylthio, aryl-C_1–C_4-alkoxy, hetaryl, hetaryloxy, hetarylthio or hetaryl-C_1–C_4-alkoxy,

$CONR^5R^6$, where R^5 and R^6 are identical or different and each denotes hydrogen, C_1–C_4-alkyl, C_3–C_6-cycloalkyl, C_2–C_5-alkenyl, aryl, hetaryl, aryl-C_1–C_4-alkyl, hetaryl-C_1–C_4-alkyl or C_1–C_4-alkylcarbonyl or together denote a C_2–C_6-alkylene chain,

or SO_mR^4, where m is 1 or 2 and R^4 is as defined above;

R^2, R^3 are identical or different and each denotes nitro, hydroxy, carboxy, mercapto or halogen,

C_1–C_4-alkyl, which may be monosubstituted by hydroxyl, mercapto, amino, aryloxy or hetaryloxy and/or monosubstituted, disubstituted or trisubstituted by halogen,

C_3–C_6-cycloalkyl, which may be monosubstituted, disubstituted or trisubstituted by halogen, hydroxyl, mercapto and/or C_1–C_4-alkyl,

C_3–C_6-cycloalkoxy,

C_3–C_6-cycloalkylthio,

C_2–C_5-haloalkenyl,

C_2–C_4-haloalkynyl,

C_1–C_4-alkoxy, which may be monosubstituted, disubstituted or trisubstituted by halogen and/or monosubstituted by aryl or hetaryl,

C_1–C_4-alkylthio, which may be monosubstituted, disubstituted or trisubstituted by halogen and/or monosubstituted by aryl or hetaryl,

C_4–C_5-alkenyloxy,

C_2–C_4-alkynyloxy,

—NR^5R^6, where R^5 and R^6 are each as defined above, or one of the groups mentioned under R^1,

W and Y are each nitrogen,

X and Z each denote a group of the formula

where R^7 is hydrozino or one of the groups mentioned under R^2,

n is 0 or 1 and

A is aryl or hetaryl, which each may carry from one to five halogen atoms and/or from one to three of the following substituents:

—SO_2R^8, where R^8 is hydroxy, C_1–C_4-alkoxy, aryl-c_1–C_4-alkoxy, aryloxy, hetaryloxy, hetaryl-C_1–C_4-alkoxy or —NR^5R^6, where R^5 and R^6 are each as defined above, and/or

the groups mentioned under R^2,

wherein the term aryl defines phenyl or naphthyl and the term hetaryl defines monocyclylic or bicyclylic 5- and 6-membered rings said monocyclyl or bicyclyl containing one or more heteroatoms, and the salts and N-oxides thereof.

4,999,046

N-(2-NITROPHENYL)-N-PYRIMIDIN-2-YLUREAS

Hermann Rempfler, Ettingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

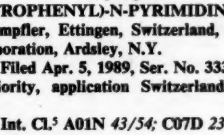
Filed Apr. 5, 1989, Ser. No. 333,377

Claims priority, application Switzerland, Apr. 12, 1988, 1335/88

Int. Cl.[5] A01N *43/54*; C07D *239/42*

U.S. Cl. 71—92 **11 Claims**

1. A compound of formula I



(I)

in which

R^1 is hydrogen, methyl, fluorine, chlorine or bromine,

R^2 is C_1–C_2haloalkyl having at least 2 fluorine atoms, and

R^3 is C_1–C_4alkyl,

with the proviso that R^2 is not trifluoromethyl when R^3 is methyl, or a salt or addition compound of formula I with an acid, base or complex former.

9. A method of controlling undesired plant growth which comprises allowing a herbicidally effective amount of a compound according to claim 1 to act on the plant to be controlled or the locus thereof.

4,999,047

XANTHAN GUM/CATIONIC COMPOUND AQUEOUS CONCENTRATES

Jean-Luc Schuppiser, Claye Souilly, France, assignor to Rhone-Poulenc Chimie, Courbevoie, France

Continuation of Ser. No. 24,073, Mar. 10, 1987, abandoned. This application Jul. 18, 1989, Ser. No. 381,486

Claims priority, application France, Mar. 10, 1986, 86 03337

Int. Cl.[5] C12P *19/06;* C07G *17/00*

U.S. Cl. 71—94 4 Claims

1. A pseudoplastic aqueous concentrate, comprising formulation, in water, of a thickening amount of a xanthan gum having a content in pyruvic acid moieties of less than 2%, and at least one pesticidally active, water soluble quaternary ammonium organic cationic compound.

4,999,048

METHOD FOR REDUCING PESTICIDE DRIFT

Donald Freepons, Kennewick, Wash., assignor to Canbra Foods Ltd., Alberta, Canada

Filed Sep. 21, 1989, Ser. No. 410,423

Int. Cl.[5] A01N *37/18, 37/38;* C07D *303/38*

U.S. Cl. 71—118 25 Claims

1. A method for reducing and controlling pesticide drift caused by crystallization of a pesticide from a pesticide spraying formulation, which method comprises incorporating an epoxidized vegetable oil into the formulation.

4,999,049

THICK FILM ELECTRICALLY RESISTIVE TRACK MATERIAL

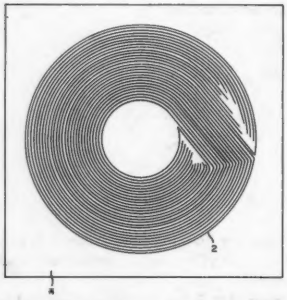
Simon N. Balderson, Reading, and Alan R. Atterbury, Eastcote, both of England, assignors to Thorn EMI plc, London, England

Filed Jul. 18, 1988, Ser. No. 220,671

Claims priority, application United Kingdom, Jul. 18, 1987, 8717035

Int. Cl.[5] C22C *29/12*

U.S. Cl. 75—234 8 Claims



1. An electrically resistive track suitable for use in a heating element, said track consisting of a thick film including a base metal constituent and a glass constituent, said thick film having in the temperature range of from 20° C. to 600° C. a temperature coefficient of resistance (TCR) less than 0.0010 per degree C.

4,999,050

DISPERSION STRENGTHENED MATERIALS

Luis E. Sanchez-Caldera, Hudson; Arthur K. Lee, Clinton; Nam P. Suh, Sudbury, and Jung-Hoon Chun, Hopedale, all of Mass., assignors to Sutek Corporation, Hudson, Mass.

Filed Aug. 30, 1988, Ser. No. 238,356

Int. Cl.[5] C22C *29/14*

U.S. Cl. 75—244 13 Claims

1. A dispersion-strengthened material comprising

a metal matrix M where M is a metal selected from the group consisting of aluminum, copper, and nickel,

a plurality of ultra-fine particles of at least one refractory boride XB_y substantially homogeneously dispersed in said metal matrix, where XB_y is a boride formed as a reaction product of boron and a metal X which reacts with boron and y is an integer, said particles having an average particle size of less than 0.1 microns with substantially few or no particles having an average size greater than 0.2 microns, and said at least one boride being within a range of about 0.05% to about 10% by weight of the dispersion-strengthened material.

4,999,051

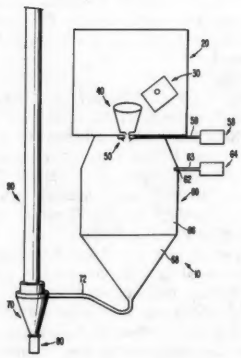
SYSTEM AND METHOD FOR ATOMIZING A TITANIUM-BASED MATERIAL

Charles F. Yolton, Caraopolis; Thomas Lizzi, Zelienople, and John H. Moll, Pittsburgh, all of Pa., assignors to Crucible Materials Corporation, Pittsburgh, Pa.

Filed Sep. 27, 1989, Ser. No. 413,177

Int. Cl.[5] B22D *23/08*

U.S. Cl. 75—338 33 Claims



1. A system for atomizing a titanium-based material to particulates in a controlled atmosphere, said system comprising:

crucible means for induction skull melting a titanium-based material;

tundish means for receiving a molten titanium-based mate-

rial, said tundish means having a bottom portion with an aperture formed therein;

means for heating said tundish means;

molten metal nozzle means for forming the molten titanium-based material into a free-falling stream exiting from said tundish means, said molten metal nozzle means being coaxially aligned with said aperture of said tundish means;

gas nozzle means for impinging said free-falling stream of the molten titanium-based material with an inert gas jet to atomize the molten titanium-based material to particulates;

means for cooling the atomized titanium-based material; and

means for collecting the cooled atomized titanium-based material.

4,999,052

METHOD OF PRODUCING NITROGEN-STRENGTHENED ALLOYS

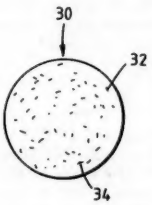
Eric G. Wilson, Preston, United Kingdom, assignor to United Kingdon Atomic Energy Authority, London, United Kingdom

Filed Sep. 20, 1989, Ser. No. 409,736

Claims priority, application United Kingdom, Oct. 5, 1988, 8823430; Jan. 18, 1989, 8901031

Int. Cl.[5] C22C 1/05

U.S. Cl. 75—338 **25 Claims**



1. A method of producing a nitrogen-strengthened steel allay, the method comprising heating a combination comprising steel alloy particles containing not more than 0.03% by weight of carbon or a permeable agglomeration thereof and a selected quantity of a nitrogen donor to effect dissociation of a least part of the nitrogen donor, thereby to make a controlled quantity of nitrogen available as a solute in at least some of the particles such that the heated alloy contains between 0.01 and 0.3% by weight of nitrogen in solid solution.

4,999,053

METHOD OF PRODUCING AN IRON-, COBALT- AND NICKEL-BASE ALLOY HAVING LOW CONTENTS OF SULPHUR, OXYGEN AND NITROGEN

Tohei Ototani, Tokyo; Toru Degawa, Kurashiki; Kanichi Kusumoto, Inagi, and Makoto Ebata, Tokyo, all of Japan, assignors to Mitsui Engineering and Ship Building Co., Ltd. and Metal Research Corporation, both of Tokyo, Japan

Continuation of Ser. No. 293,837, Jan. 5, 1989, which is a division of Ser. No. 10,598, Feb. 3, 1987, Pat. No. 4,820,485, which is a division of Ser. No. 937,426, Dec. 3, 1986, Pat. No. 4,729,787, which is a continuation-in-part of Ser. No. 799,383, Nov. 18, 1985, abandoned. This application Nov. 27, 1989, Ser. No. 441,600

The portion of the term of this patent subsequent to Mar. 8, 2005, has been disclaimed.

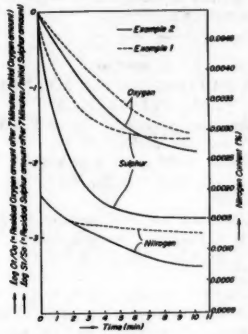
Int. Cl.[5] C21C 7/02

U.S. Cl. 75—564 **16 Claims**

1. A method of producing an iron-, nickel-, and cobalt-base alloy having an oxygen content of less than 0.002%, a sulphur content of less than 0.002%, and a nitrogen content of less than 0.03%, comprising the steps of:

(a) holding a molten alloy in a container selected from the group consisting of a lime crucible, a lime crucible furnace, a converter and a ladle lined with a basic refractory consisting of 15–85% of calcium oxide (CaO) and 15–75% of magnesium oxide (MgO), wherein said alloy consists essentially of at least one major ingredient selected from the group consisting of iron (Fe), nickel (Ni), and cobalt (Co);

(b) adding at least one additive into said molten alloy in an atmosphere selected from the group consisting of a non-oxidizing atmosphere and a vacuum, wherein said additive is selected from the group consisting of aluminum (Al) and aluminum alloys;



(c) desulphurizing, deoxidizing and denitrifying said molten alloy in the presence of aluminum, calcium and magnesium under an atmosphere selected from the group consisting of a non-oxidizing atmosphere and a vacuum, whereby the molten alloy contains 0.005 to 7.0% of residual aluminum, 0.0001 to 0.02% of residual calcium, and 0.0001 to 0.03% of residual magnesium; and

(d) casting said molten alloy into a mold.

4,999,054

GOLD PLATING SOLUTIONS, CREAMS AND BATHS

Lawrence M. Perovetz, Stanmore, England, and Nagendra N. Bhattacharya, Greenway Tylers Green, United Kingdom, assignors to Lamerie, N.V., Jersey, Channel Islands

Continuation-in-part of Ser. No. 944,333, Dec. 19, 1986, Pat. No. 4,832,743. This application Dec. 8, 1987, Ser. No. 130,074

The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

Int. Cl.[5] C23C 3/00

U.S. Cl. 106—1.23 **82 Claims**

1. A non-toxic solution for gold plating metallic items such as silver, copper, nickel, brass or gold alloys or silver plated or gold plated metallic items comprising effective amounts of:

(1) a water soluble gold salt as a gold generating compound selected from the group consisting of potassium tetrachloroaurate, potassium tetrabromoaurate, potassium tetraiodoaurate, sodium tetrachloroaurate, sodium tetrabromoaurate, sodium tetraiodoaurate, sodium thiosulfatoaurate, and sodium aurothiomalate;

(2) a complexing compound selected from the group consisting of thiourea, sodium thiosulfate, and thiomalic acid;

(3) a stabilizer selected from the group consisting of polyvinyl pyrrolidone, colloidal cellulose ether, hydroxy lower alkyl starches, polyvinyl alcohol and peptone; and

(4) water.

4,999,055

TiO_2 PIGMENTS RESISTANT TO DISCOLORATION IN THE PRESENCE OF POLYMER ADDITIVES

Dwight A. Holtzen, and Austin H. Reid, Jr., both of Newark, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 151,672, Feb. 3, 1988, abandoned. This application Sep. 6, 1989, Ser. No. 404,730
Int. Cl.[5] C09C *1/36*
U.S. Cl. 106—436 9 Claims

1. Inorganic pigment coated with maleic, malonic, benzoic, fumaric or phthalic acid or mixtures thereof, said acid being present in the amount of about 0.01–6 percent, based on the weight of the inorganic pigment.

4,999,056

METHOD AND A COMPOSITION FOR PREPARING A SHAPED ARTICLE

Thorkild H. Rasmussen, Norrehave, Denmark, assignor to Densit A/S Rordalsuej, Denmark

PCT No. PCT/DK87/00091, § 371 Date Mar. 10, 1988, § 102(e) Date Mar. 10, 1988, PCT Pub. No. WO88/00575, PCT Pub. Date Jan. 28, 1988
PCT Filed Jul. 15, 1987, Ser. No. 171,005
Claims priority, application Denmark, Jul. 15, 1986, 3371/86
Int. Cl.[5] C04B *7/02, 14/04*
U.S. Cl. 106—737 48 Claims

1. A method for preparing a shaped article with a binder matrix prepared from a mix consisting essentially of a Portland cement, a fine silica-rich powder, water and a concrete superplasticizer, in the proportions of at least 0.1 part of the silica-rich powder, up to 0.35 part water, and from 0.01 to 0.04 part of the concrete superplasticizer dry matter per part by weight of the mixture of the cement and silica-rich powder, the method comprising

(a) selecting the cement and fine silica-rich powder by measuring the contents of water-soluble Na and K in the cement and the fine silica-rich powder, calculating the contents of water-soluble Na and K as Na_2O-equivalents, and selecting a cement and a fine silica-rich powder that will result in a content of water-soluble alkali metal in the mix originating from the cement or the fine silica-rich powder of at the most 0.30%, calculated as Na_2O equivalents, based on the weight of the cement in the mix,

(b) preparing a mix comprising the cement, the fine silica-rich powder, water, and a concrete superplasticizer,

(c) arranging the mix in a shaped configuration and allowing the mix to solidify.

4,999,057

FLUID TILLER APPARATUS

Myron L. Peterson, Kingman, Ariz., assignor to Schleicher Electronic GmbH & Co. KG, Fed. Rep. of Germany

Filed Dec. 19, 1988, Ser. No. 335,961
Int. Cl.[5] A01C *23/02*
U.S. Cl. 111—7.1 4 Claims

1. A hand manipulable tool for use in tilling the soil, said tool comprising:

an elongate handle for grasping by a user at one end;

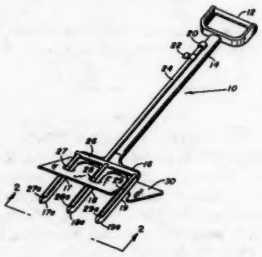
a soil penetrating portion at the other end of said handle and having a plurality of tine members, each of said tine members having an end in fixed relation to said handle for penetrating the soil upon application of force to the tool;

fluid delivery means including

(a) tube means attached to said handle and including coupler means for connection to a garden hose or the like;

(b) valve means in fluid flow relation with said tube means for enabling selective control of the flow of water through the coupler from a pressurized municipal water source with a hose connected thereto, said valve means being positioned adjacent said one end of said handle for operation by the user during use of the tool;

(c) water passage manifold means in fluid flow communication with said valve means and having at least one opening adjacent the soil penetrating end of each of said tine members for enabling said opening to penetrate the soil concurrently with said end, said fluid delivery means enabling the selective control and passing of water under pressure through said manifold means and through said at least one opening for contact with the soil to assist in tilling the soil; and



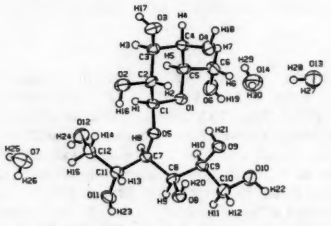
water backsplash shield means having apertures therein for receipt of said tine members therethrough for slidably coupling to said tine members for enabling initial positioning of said shield means adjacent the tine ends and permitting said shield means to axially move along said tine members in response to contact with the soil as said tine members enter the soil.

4,999,058

LACTITOL TRIHYDRATE CRYSTAL, CRYSTALLINE MIXTURE SOLID CONTAINING IT AND PROCESS FOR PREPARING THEM

Shigeru Kawashima; Hiroshi Ide, both of Shizuoka; Kazuaki Kato, Saitama; Mitsuo Magara, and Yoshibumi Ishii, both of Shizuoka, all of Japan, assignors to Towa Chemical Industry Co., Ltd., Tokyo, Japan

Filed Jan. 24, 1990, Ser. No. 469,342
Claims priority, application Japan, Jan. 31, 1989, 1-19451
Int. Cl.[5] C07H *15/08*
U.S. Cl. 127—29 8 Claims



1. A trihydrate crystal of lactitol having a molecular formula $C_{12}H_{24}O_{11}\cdot 3H_2O$ and a melting point of 52–56° C.

4,999,059

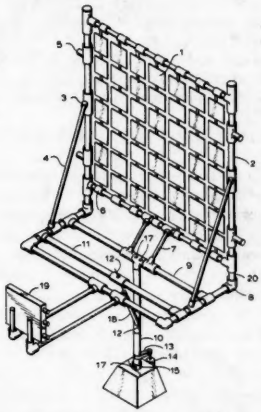
UNIVERSAL SOLAR CONCENTRATOR PANEL

Bagno Robert G., 274 Pulaski Rd., Kings Park, N.Y. 11754

Filed Aug. 11, 1989, Ser. No. 392,652
Int. Cl.[5] H01L *31/058*
U.S. Cl. 136—248 9 Claims

1. A solar concentrator device comprising a solar energy receiver; and a flat solar energy reflector arranged to reflect solar energy to said receiver, said reflector including a substantially square-shaped frame limiting an inner space, a plurality of individual flat reflective panels arranged in said space in a

first group or rows extending in a first direction and a second group of rows extending in a second direction substantially transverse to said first direction and so that each of said panels is turnable about three mutually perpendicular axes, and means for mounting said panels so that they are turnable about said axes, said mounting means including first means which connect said panels in said rows extending in one of said directions so that said panels in each of said rows extending in said one direction are jointly turnable about a first one of said axes, second means for mounting each of said panels so that in each



of said rows extending in said one direction each of said panels is turnable about a second one of said axes, and third means for mounting each panel in each of said rows extending in said one direction so that each of said panels is turnable about a third one of said axes.

8. A solar concentrator device as defined in claim 1, wherein said receiver includes a box forming an inner chamber, a plurality of photovoltaic cells sealed with a clear plastic and accommodated in said chamber, and water filling said chamber and surrounding said photovoltaic cells.

4,999,060

SOLAR CELL PACKAGING ASSEMBLY FOR SELF-CONTAINED LIGHT

Klara Szekely, West Hills; Bethanne Felder, and Lloyd V. Wallace, both of Thousand Oaks, all of Calif., assignors to Siemens Solar Industries, L.P., Camarillo, Calif.

Filed Aug. 11, 1989, Ser. No. 392,502
Int. Cl.[5] H01L *31/048*
U.S. Cl. 136—251 **5 Claims**

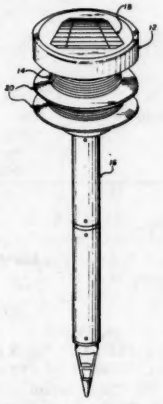
1. A solar cell packaging assembly comprising:

a tray including a floor and a side wall;

a plurality of electrically interconnected solar cells disposed within said tray;

an optically clear material substantially surrounding said solar cells and contained within said sidewall to secure said cells within said tray, said material being resiliently deformable to permit said cells to expand and contract without damage; and

a transparent cover over said solar cells, said cover being received by said tray at mutually contacting surfaces, said contacting surfaces between said tray and said cover defining a first horizontal plane and a second vertical plane orthogonally adjoining each other, said horizontal plane being disposed below said vertical plane, thereby substantially excluding the entry of moisture by providing



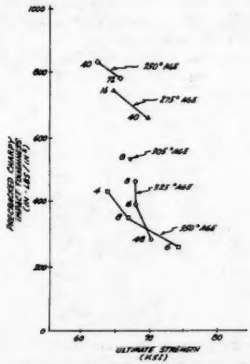
a tortuous path for the entry of moisture into said assembly.

4,999,061

LOW TEMPERATURE UNDERAGING OF LITHIUM BEARING ALLOYS AND METHOD THEREOF

R. Eugene Curtis, Issaquah; G. Hari Narayanan, Seattle, and William E. Quist, Redmond, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Continuation of Ser. No. 800,503, Nov. 21, 1985, Pat. No. 4,840,682, which is a continuation-in-part of Ser. No. 567,227, Dec. 30, 1983, abandoned. This application Apr. 14, 1989, Ser. No. 337,956
The portion of the term of this patent subsequent to Jun. 20, 2006, has been disclaimed.
Int. Cl.[5] C22F *1/04*
U.S. Cl. 148—12.7 A **6 Claims**



1. A process for intentionally improving the fracture toughness of an aluminum-lithium alloy without detracting from the strength of said alloy, said alloy consisting essentially of:

Element	Amount (wt %)
Li	1.0 to 3.2

-continued

Element	Amount (wt %)
Mg	0 to 5.5
Cu	0 to 4.5
Zr	0.08 to 0.15
Mn	0 to 1.2
Fe	0.3 max
Si	0.5 max
Zn	0.25 max
Ti	0.15 max
Other trace elements	
each	0.05 max
total	0.25 max
Al	Balance,

said alloy first being formed into an article, solution heat treated and quenched, said process comprising the step of aging said alloy article to a predetermined underaged strength level at from about 200° to 305° F.

4,999,062

EMULSION EXPLOSIVE COMPOSITION CONTAINING A CONDENSATION PRODUCT

Margaret J. Snare, Thornbury; David Yates, East Brunswick, and Ross Sanders, Essendon, all of Australia, assignors to ICI Australia Operations Proprietary Limited, Melbourne, Australia

Filed Feb. 23, 1989, Ser. No. 313,846

Claims priority, application Australia, Feb. 23, 1988, PI 6919

Int. Cl.[5] C06G *45/00*

U.S. Cl. 149—2 **24 Claims**

1. An emulsion explosive composition comprising a discontinuous phase comprising an oxygen-releasing salt, a continuous water-immiscible organic phase and from 0.1 to 5% by weight of the composition, of an emulsifier component consisting essentially of a condensation product of a primary amine and a poly[alk(en)y]succinic acid or anhydride and wherein the condensation product comprises at least 70% by weight succinimide product.

4,999,063

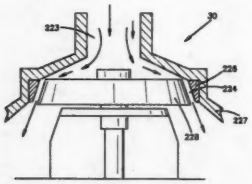
PROCESS FOR MANUFACTURING A GAS GENERATING MATERIAL

Thomas H. Vos, Rochester; James M. Kumkoski, Utica, both of Mich.; Leo S. Knowlden, Gilbert, Ariz., and George W. Goetz, Rochester Hills, Mich., assignors to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio

Filed Jun. 7, 1990, Ser. No. 535,116

Int. Cl.[5] D03D *23/00*

U.S. Cl. 149—109.6 **16 Claims**



1. A process comprising the steps of:

preparing a wet mixture of powder ingredients, at least one of said powder ingredients having a predetermined average particle size;

directing the wet mixture at least once through a grinding gap defined by a rotor and a stator;

rotating the rotor as the wet material flows through the grinding gap to reduce the average particle size of at least the one of the ingredients in the wet mixture;

flowing the wet mixture from the grinding gap through a chamber containing grinding media;

agitating said grinding media as the mixture flows through the chamber to further reduce the average particle size of at least the one ingredient; and

processing the mixture from the chamber into gas generating particles.

4,999,064

PROCESS FOR PRODUCING WEATHER RESISTANT CONSTRUCTION ELEMENTS

Marc Knaepen, Landen, Belgium, assignor to Exxon Chemical Patents, Inc., Linden, N.J.

Continuation of Ser. No. 877,253, Jun. 23, 1986, abandoned. This application May 24, 1989, Ser. No. 356,783

Claims priority, application United Kingdom, Jun. 28, 1985, 85-16480

Int. Cl.[5] B32B *17/00, 23/08;* D04H *1/02*

U.S. Cl. 156—62.2 **20 Claims**

1. A process for producing a weather resistant construction element comprising contacting a body of woodchips or lignocellulosic fibres impregnated with a binding agent, with a layer of vulcanisable synthetic elastomeric material thereby forming an assembly and subjecting said assembly to hot pressing so as simultaneously to compress said body, harden the binding agent and vulcanise the elastomeric material, characterised in that the binding agent comprises a heat-curable polar resin adhesive and the vulcanisable elastomeric material comprises (a) a copolymer rubber of ethylene and at least one other alpha-olefin and/or a terpolymer rubber of ethylene, at least one other alpha-olefin and a minor proportion of at least one copolymerisable polyene and (b) a peroxide curative system for the rubber, present in an amount effective to vulcanise the rubber under the applied hot press conditions.

4,999,065

METHOD OF MAKING AN IDENTIFICATION CARD

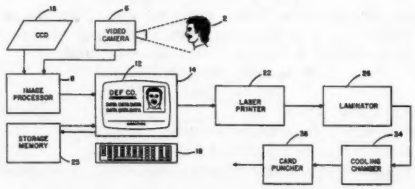
Ronald A. Wilfert, Boston, Mass., assignor to Lasercard Company L.P., Acton, Mass.

Division of Ser. No. 59,940, Jun. 9, 1987, which is a continuation of Ser. No. 817,242, Jan. 8, 1986, Pat. No. 4,687,526. This application Jun. 8, 1988, Ser. No. 203,987

The portion of the term of this patent subsequent to Aug. 18, 2004, has been disclaimed.

Int. Cl.[5] B32B *31/2, 31/20*

U.S. Cl. 156—64 **6 Claims**



1. A method of fabrication an identification card, comprising the steps of:

recording an identification image in the form of a first set of digital data,

processing said first set of data to produce a visible reproduction of said image,

providing a second set of digital data representing additional identification information, and

printing a visual pattern controlled by said sets of data on a sheet of material.

4,999,066

PROCESS FOR BONDING TILES TO SUBSTRATE USING MAGNESIUM PHOSPHATE COMPRISING ACTIVATOR PREPARED BY MIXING INERT POROUS MATERIAL WITH LIQUID P_2O_5 MATERIAL

Fawzy G. Sherif, Stony Point, N.Y., assignor to Stauffer Chemical Company, Shelton, Conn.

Continuation-in-part of Ser. No. 788,664, Oct. 17, 1985, Pat. No. 4,755,227, and a continuation-in-part of Ser. No. 896,709, Nov. 3, 1986, and a continuation-in-part of Ser. No. 908,878, Sep. 15, 1986, and a continuation-in-part of Ser. No. 787,407, Oct. 15, 1985, said Ser. No. 788,664, is a continuation of Ser. No. 617,317, Jun. 7, 1984, abandoned, which is a continuation-in-part of Ser. No. 522,077, Aug. 11, 1983, abandoned, said Ser. No. 896,709, is a continuation-in-part of Ser. No. 736,015, May 20, 1985, abandoned, said Ser. No. 908,878, is a continuation-in-part of Ser. No. 735,918, May 20, 1985, abandoned. This application Oct. 3, 1986, Ser. No. 914,917

Int. Cl.[5] E04B *2/00*

U.S. Cl. 156—71 **10 Claims**

1. A process for bonding tiles to a substrate which comprises:

(a) preparing a cementitious magnesium phosphate composition comprising:

(i) an activator prepared by mixing an inert porous material with a sufficient amount of a liquid P_2O_5-material to at least form a paste followed by heating the resulting material to yield a dry solid;

(ii) a source of magnesium;

(iii) sufficient water to form a paste;

(b) applying the magnesium phosphate composition to either the tile or substrate, or both; and then

(c) bringing together the tile and substrate with the cementitious composition therebetween to bond the tile to the substrate and allowing the cementitious composition to set at ambient temperatures.

4,999,067

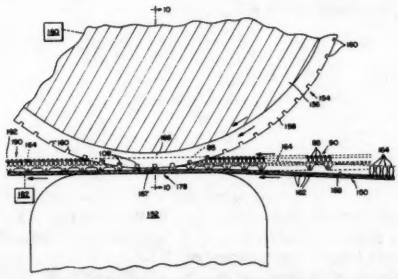
METHOD FOR MAKING A HERMAPHRODITE HOOK AND LOOP FASTENERS

George H. Erb, Cuttingsville, and Susan E. Beard, Rutland, both of Vt., assignors to Erblok Associates, Charlottesville, Va.

Filed Feb. 13, 1989, Ser. No. 310,522

Int. Cl.[5] B29C *47/00*; A44B *17/00, 18/00*

U.S. Cl. 156—73.1 **16 Claims**



1. The method of making a multiple-hook fastener capable of hooking engagement with an opposed fastener area containing a multiplicity of loop-like openings into which the hooks can become engaged by bringing said multiple-hook fastener into contact with such an opposed fastener area, comprising the steps of:

forming thermoplastic material into a plurality of hook-ribbons,

each hook-ribbon having an upper margin and a lower margin,

each upper margin having a multiplicity of hooks upstanding in a row along the margin,

each lower margin having a plurality of downwardly projecting mounting projections, with the respective mounting projections being located at predetermined intervals along the lower margin, with a pair of shoulders being opposite sides of respective mounting projections,

by defining a plurality of continuous mold cavities each having the shape of a hook-ribbon and continuously moving through an injection zone by providing a plurality of endless, flexible mold bands and by revolving said mold bands endwise and by bringing the revolving mold bands into layered relationship pressed together one on top of another in said injection zone,

injection heated thermoplastic material in said injection zone into the continuously moving continuous mold cavities for shaping the injected heated thermoplastic material into the shapes of a plurality of hook-ribbons,

cooling such shaped thermoplastic material for forming a plurality of hook-ribbons in the continuously moving plurality of mold cavities,

separating the continuously moving mold bands from their layered relationship for opening the mold cavities, and

removing the hook-ribbons from the separated continuously moving mold bands,

providing an area of flexible substrate,

feeding the substrate through a bonding station,

positioning a plurality of hook ribbons in laterally spaced side-by-side relationship,

feeding said plurality of hook-ribbons laterally spaced at predetermined spacing through the bonding station together with said substrate,

orienting said hook-ribbons with their mounting projections facing toward the area of substrate in the bonding station and with their hooks upstanding away from the substrate,

in said bonding station pushing pairs of opposed shoulders of the hook-ribbons toward said substrate for thrusting the mounting projections onto the substrate, and

ultrasonically bonding said mounting projections to the substrate for producing the multiple-hook fastener having rows of hooks upstanding therefrom.

4,999,068

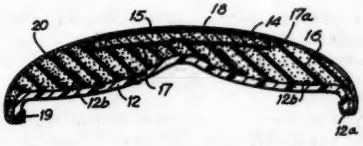
METHOD FOR MAKING AN ANATOMICAL MULTILAYER BICYCLE-TYPE SEAT

Michele A. Chiarella, Via Vall'Orba 22, Lugano, Switzerland

Division of Ser. No. 86,236, Aug. 10, 1987, Pat. No. 4,815,361, which is a continuation of Ser. No. 833,332, Feb. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 794,302, Nov. 1, 1985, abandoned. This application Nov. 14, 1988, Ser. No. 270,968

Int. Cl.[5] B32B *31/14, 5/18*

U.S. Cl. 156—78 **10 Claims**



1. A method for constructing an anatomical multi-layer bicycle-type seat having a lower rigid shell, a flexible outer cover sheet, and an encapsulated gel layer located between said shell and said outer cover sheet, the method comprising the steps of:

(a) providing an upper surface of a formed relatively rigid lower shell as a first mold surface;

(b) providing a rigid shaped object having a desired upper surface shape of said seat as a second mold surface;

(c) forming a mold cavity with said first and second mold surfaces;

(d) forming a cured foam or rubber-like material layer in said mold having a central cavity;

(e) including a soft resilient gel layer in said central cavity so as to engage at least two lateral edges of said gel layer to constrain the gel layer against substantial lateral movement; and

(f) placing a flexible cover sheet over said foam and gel layers after separating said mold surfaces and attaching said cover sheet firmly onto the periphery of said shell, whereby said gel layer is constrained against substantial lateral movement and is permitted only limited vertical defiection.

4,999,069

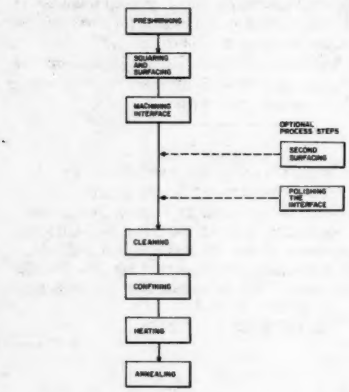
METHOD OF BONDING PLASTICS

Tom S. Brackett, New Britain, Conn., and Milo E. Webster, Braintree, Mass., assignors to Integrated Fluidics, Inc., Plainville, Conn.

Continuation-in-part of Ser. No. 105,607, Oct. 6, 1987, Pat. No. 4,875,956. This application Jun. 2, 1989, Ser. No. 360,267

Int. Cl.[5] B32B *31/12*

U.S. Cl. 156—84 14 Claims



1. A method of producing an intermolecular bonded interface between two pieces of acrylic material comprising the steps of:

a. preshrinking the acrylic pieces to obtain dimensional stability,

b. forming an interface surface on each piece, the interface surfaces conforming in shape to each other,

c. assembling the pieces with the interface surfaces in contact with each other,

d. confining the pieces to restrict expansion in all directions except normal to the interface,

e. applying a limited resistance to expansion normal to the interface, and

f. applying heat to the assembled pieces to induce their expansion against their confinement to cause transmigration of molecules from one interface to another to bond the pieces together while controlled expansion takes place normal to the interface.

4,999,070

NEW ARTICLES OF MANUFACTURE AND THEIR PRODUCTION

Gregory A. Ferro, Hoffman Estates, Ill., assignor to Imi-Tech Corporation, Elk Grove Village, Ill.

Filed Oct. 24, 1988, Ser. No. 261,126

The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

Int. Cl.[5] B32B *31/26*

U.S. Cl. 156—85 35 Claims

1. A process which comprises compressing and heat curing the coating or lamination on a coated or laminated substrate wherein the coating or lamination is a non-resilient, non-flexible recurable material formed by subjecting cured polyimide foam to the action of-pressurized steam.

4,999,071

PROCESS FOR MANUFACTURING LAMINATED SAFETY GLASS

Eitaro Nakamura, Tokyo, and Toyoichi Arai, Himi, both of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 124,516, Nov. 24, 1987, abandoned. This application May 31, 1989, Ser. No. 361,684

Claims priority, application Japan, Nov. 25, 1986, 61-280243

Int. Cl.[5] B32B *17/00*

U.S. Cl. 156—99 15 Claims

1. A process for manufacturing laminated safety glass, which comprises the steps of:

(A) coating at least one side of a glass plate with a liquid plastisol comprising 20 to 80 parts by weight of a plasticizer and 100 parts by weight of a particulate resin dispersed in said plasticizer, said resin comprising at least an epoxy group-containing vinyl chloride resin;

(B) heating the plastisol coated glass plate to gel the plastisol; and

(C) laminating another glass plate on said plastisol coated glass plate through the gelled plastisol and heating the resulting laminate, thereby bonding the laminated glass plates to each other.

4,999,072

METHOD OF MAKING AN INSOLE PRODUCT

Louis Dischler, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

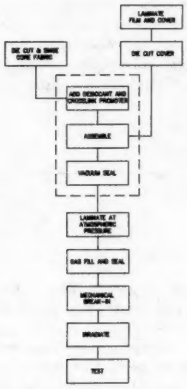
Continuation-in-part of Ser. No. 110,233, Oct. 19, 1987, abandoned, which is a division of Ser. No. 920,590, Oct. 20, 1986, abandoned. This application Mar. 4, 1988, Ser. No. 168,596

Int. Cl.[5] A43B *13/20;* B32B *31/06*

U.S. Cl. 156—145 6 Claims

1. The method of manufacturing an insole product comprising the steps of: die-cutting a core fabric, die-cutting at least two barrier films to a size slightly larger than the core fabric, treating the core fabric with a desiccant prior to encapsulation between the barrier films, placing the core fabric between at least two of the die cut barrier films, sealing the edges of the barrier films around the core fabric to encapsulate the same,

punching a hole in one of the barrier films, delivering a low molecular weight gas at a pressure in the range of 10–50 p.s.i.g.



into the insole product through the hole and sealing the hole previously punched in the barrier film.

4,999,073

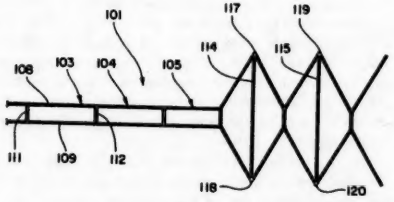
HONEYCOMB PLEATER

Jamee Kao, 2400 S. Whitehall Dr. #2062, Mundelein, Ill. 60060, and Joseph Hsu, 461-35 Chung-Shan N. Rd. Sec. 5, Taipei, Taiwan

Continuation-in-part of Ser. No. 24,695, Mar. 11, 1987, Pat. No. 4,795,515. This application Jan. 31, 1989, Ser. No. 304,316

Int. Cl.[5] B32B *3/12*

U.S. Cl. 156—197 **12 Claims**



1. A method of forming a honeycomb panel consisting of a plurality of interconnected expanded honeycomb cells, including the steps of forming an unpleated tubular structure generally consisting of a plurality of adjacent and connected tubes with each tube including closely spaced parallel unpleated side walls having a length substantially greater than the resulting honeycomb cells, with the side walls being interconnected by relatively short end walls, and pleating the tubes and simultaneously expanding the connected tubes serially by drawing out the side walls in a direction perpendicular to the parallel unpleated side walls at their mid-points away from one another to form a honeycomb panel having a single row of expanded cells one on top of the other.

4,999,074

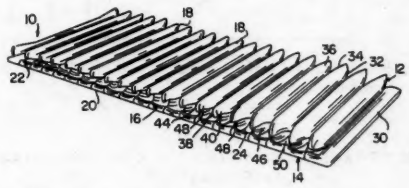
METHOD FOR THE PRODUCTION OF AN AIR MATTRESS

Levon Afeyan, Hampstead, Canada, assignor to Afeyan Industries Inc., Montreal, Canada

Division of Ser. No. 304,317, Jan. 31, 1989, Pat. No. 4,914,771. This application Jan. 29, 1990, Ser. No. 471,772

Int. Cl.[5] B32B *31/12, 3/26*

U.S. Cl. 156—204 **9 Claims**



1. A method for the production of an air mattress comprising:

(i) feeding a first predetermined length of flexible air impervious material having a pair of spaced apart longitudinal edges, from a supply,

(ii) forming a laterally extending fold in said first predetermined length, said fold being defined by fold lines extending laterally between said spaced apart longitudinal edges,

(iii) forming an air impervious seam at opposed ends of each fold,

(iv) repeating steps (i) to (iii) a predetermined number of times to produce a desired length of said flexible, air impervious material having a plurality of pillow-forming elements defined by the laterally extending folds in side-by-side relationship, in which each fold is seamed at outer ends thereof,

(v) severing the desired length in iv) from said supply to provide a flexible, elongate upper layer-forming member having spaced apart longitudinal edges and spaced apart end edges,

(vi) disposing said upper layer-forming member on a lower layer of a flexible, air impervious material having spaced apart longitudinal edges and spaced apart end edges in opposed relationship with the corresponding edges of said upper layer-forming member,

(vii) seaming said opposed edges to form an air chamber between said upper layer-forming member and said lower layer, and joining opposed portions of said upper and lower layers together between adjacent pillow-forming elements.

4,999,075

PROCESSES OF MASS MANUFACTURING A PLURALITY OF SECURITY CARDS AND PROCESSES OF MANUFACTURING SECURITY CARD SUBSTRATES FROM WHICH A PLURALITY OF SECURITY CARDS MAY BE FURTHER MANUFACTURED

Joseph W. Coburn, Jr., 953 Princewood Ave., Lakewood, N.J. 08701

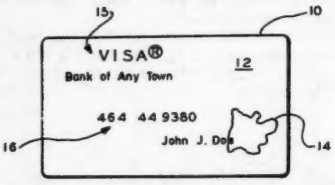
Filed Jun. 7, 1989, Ser. No. 362,841

Int. Cl.[5] B29D *9/00*

U.S. Cl. 156—209 **7 Claims**

3. Process of manufacturing a security card substrate from which a plurality of security cards may be further manufactured, comprising the steps of:

(a) embossing a surface of a layer of plastic film at predetermined locations with visual image producing devices; and



(b) metalizing said surface including said visual image producing devices.

4,999,076

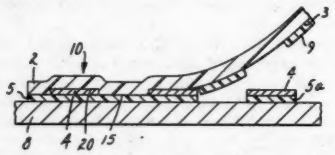
DRY TRANSFER GRAPHICS ARTICLE METHOD OF PREPARATION

Joseph H. Incremona, and Richard H. Lundeen, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 25,117, Mar. 20, 1987, Pat. No. 4,919,994, which is a continuation-in-part of Ser. No. 846,755, Apr. 1, 1986, abandoned. This application Jan. 16, 1990, Ser. No. 465,360

Int. Cl.[5] B44C *1/00;* **B41M** *3/12;* **B05D** *5/10*

U.S. Cl. 156—241 **17 Claims**



1. A method of preparing a dry transfer graphic article for application to a substrate, said method comprising:

(a) first, coating a release liner with at least one continuous layer of adhesive having first and second segments; and

(b) applying in imagewise fashion at least one layer of an imaging material to the exposed surface of said adhesive, and forming a graphic pattern from said imaging material, said graphic pattern being bonded to said first segments of said adhesive; then

(c) contacting said graphic pattern and the exposed surface of said adhesive with a major surface of a continuous carrier film having first and second surface portions, said first portions covering said graphic pattern and said second portions bonding to said second segments of said adhesive; then

(d) applying sufficient pressure to said carrier film to adhere said adhesive thereto; and

(e) prior to step (c), priming said major surface of said carrier with at least one of the following: bohmite, sputter etch, oxygen plasma treatment, or modified sol gel, such that said major surface is capable of providing an adhesive bond to said second segments of said adhesive layer which is greater than the applied adhesive bond between said adhesive layer and said substrate;

wherein said adhesive and said major surface of said carrier film exhibit sufficiently high compatibility to provide a strong bond therebetween, and said major surface of said carrier film and said graphic pattern exhibit sufficiently low compatibility that only a clinging bond is provided therebetween, and the work to fracture of said adhesive layer is sufficiently low that, upon application of a peel force to said carrier film, said adhesive will preferentially fracture according to the edges of said graphic pattern while the bond between said second segments of said adhesive and said second surface portions of said carrier film and the bond between said first segments of said adhesive and said graphic pattern will remain intact;

whereby, upon adhering said article to said substrate, application of a peel force to said carrier film allows selective separation from said substrate of said carrier film together with said second segments of said adhesive along the edge of said graphic pattern, leaving on said substrate said graphic pattern and said first segments of said adhesive in registry therewith.

4,999,077

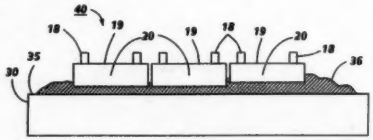
METHOD OF FABRICATING FULL WIDTH SCANNING OR IMAGING ARRAYS FROM SUBUNITS

Donald J. Drake, Rochester; Michael R. Campanelli, Webster; Cathie J. Burke, Rochester, and Diane Atkinson, Marion, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 31, 1989, Ser. No. 401,379

Int. Cl.[5] B32B *31/00*

U.S. Cl. 156—299 **7 Claims**



1. A method for fabricating a coplanar full width scanning or imaging array on a flat structural member from relatively short linear scanning or imaging subunits by precision colinear placement, even though the subunits' scanning or imaging elements and associated circuitry are on one surface thereof with at least some of the subunits having different thicknesses, comprising the steps of:

(a) depositing and patterning a thick film, photopatternable layer on the surface of the subunits which contain the scanning or imaging elements and associated circuitry to form one or more thick film keys thereon;

(b) providing a pagewidth alignment fixture comprising a substrate having a flat surface and a patterned thick film photopatternable layer on the flat surface, the patterned thick film layer having a plurality of accurately located keyways which have shapes complementary to the keys of the subunits, the keyways being open at one end and closed at the other for precision alignment of the subunits on the alignment fixture;

(c) inverting the subunits and inserting the subunit keys into the alignment fixture keyways, so that one end of the keys contact the closed end of the keyways;

(d) coating a conformal adhesive on a surface of the structural member;

(e) placing the conformal adhesive on the structural member in contact with the surface of the subunits residing upside down with the subunit keys residing in the keyways of the alignment fixture;

(f) curing the adhesive; and

(g) removing the structural member with the accurately positioned scanning subunits bonded thereto, the surfaces of the subunits being precisely colinearly fixed to form a pagewidth scanning or imaging array in which all of the surfaces of the subunits are coplanar even though the thicknesses of the subunits vary.

4,999,078

REDUCING BLOCKING AND INCREASING FLOW OF PLASTICIZED POLYVINYL BUTYRAL SHEET

Ashok Misra, New Delhi, India; Donald J. David, Amherst, and Arijit M. DasGupta, Holyoke, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Nov. 7, 1988, Ser. No. 268,317

The portion of the term of this patent subsequent to Mar. 12, 2008, has been disclaimed.

Int. Cl.[5] C09J 0/00

U.S. Cl. 156—327 17 Claims

1. A process for increasing the resistance to blocking of plasticized polyvinyl butyral sheet containing residual hydroxyl groups which comprises incorporating into the formulation from which the sheet is made an effective block-reducing amount of ionomeric groups chemically bound to oxygen atoms of adjacent precursor vinyl alcohol groups.

4,999,079

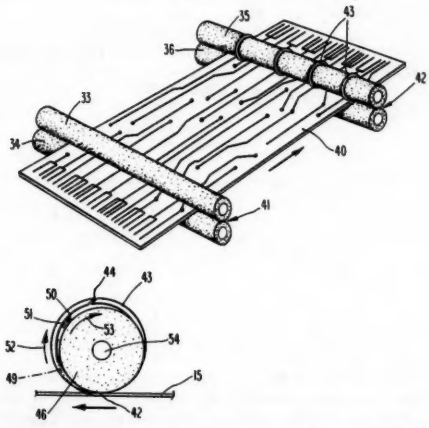
PROCESS AND APPARATUS FOR TREATING ARTICLES AND PREVENTING THEIR WRAP AROUND A ROLLER

James J. Ash, Centre Hall, Pa., assignor to Chemcut Corporation, State College, Pa.

Filed Jun. 2, 1989, Ser. No. 360,349

Int. Cl.[5] C23F 1/02; B08B 3/04, 11/00, 15/00

U.S. Cl. 156—345 14 Claims



1. A process for chemically treating flexible, generally flat discrete articles that have leading and trailing edges and which are sufficiently thin to have a tendency to wrap around a nip roller when leaving a roller nip in the presence of a liquid, when the treatment is in a chamber with a liquid treatment fluid, wherein the fluid is applied to articles being delivered along a path of travel for the articles, the process comprising the steps of:

(a) providing a substantially closed chamber for treating articles therein;

(b) serially delivering the articles along a path of travel through the chamber;

(c) applying a liquid treatment fluid to the articles being delivered along their path of travel through the chamber;

(d) engaging the articles in a nip between opposed rotating cylindrical surfaced roller members in the chamber to keep treatment fluid that is being applied to the articles in the chamber from passing downstream of the nip; and

(e) contacting the thin flexible discrete articles as their leading edges pass downstream of and while close to the nip of the roller members and urging the articles away from a surface of one of said roller members to restrain the thin, flexible articles coming out of the nip from adhering to the surface of said roller member.

8. Apparatus for chemically treating flexible, generally flat discrete articles that have leading and trailing edges and which are sufficiently thin to have a tendency to wrap around a nip roller when leaving a roller nip in the presence of a liquid, when the treatment is in a chamber with a liquid treatment fluid, wherein the fluid is applied to articles being delivered along a path of travel for the articles, the apparatus comprising:

(a) means providing a substantially closed chamber for treating articles therein;

(b) means for serially delivering the articles along a path of travel through the chamber;

(c) means for applying a liquid treatment fluid to the articles being delivered along their path of travel through the chamber;

(d) means comprising opposed rotating cylindrical surfaced roller members mounted in the chamber to engage the articles in a nip therebetween to keep treatment fluid that is being applied to articles in the chamber from passing downstream of the nip; and

(e) means for contacting the flexible discrete articles as their leading edges pass downstream of and while close to the nip of the roller members and urging the articles away from a surface of one of said roller members to restrain the flexible articles coming out of the nip from adhering to the surface of said roller member.

4,999,080

APPARATUS FOR PRODUCING A NONWOVEN FABRIC FROM CONTINUOUS FILAMENTS

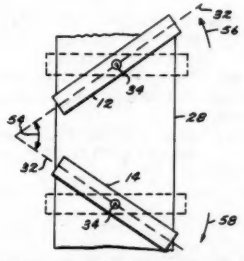
Heinz-H. Boich, Peine, Fed. Rep. of Germany, assignor to Corovin GmbH, Peine, Fed. Rep. of Germany

Filed May 26, 1989, Ser. No. 357,731

Claims priority, application Fed. Rep. of Germany, May 27, 1988, 3818033

Int. Cl.[5] D04H 3/00, 3/04

U.S. Cl. 156—441 10 Claims



1. An apparatus for producing a nonwoven fabric from continuous filaments comprising:

(*a*) a delivery belt (**28**) moving in a production direction (**30**);

(*b*) first and second spinning beams (**12, 14**) provided spaced apart form one another in the production direction (**30**), each spinning beam comprising a spinning plate having spinnerets and further comprising a filament draw-off apparatus (**24**) and a delivery apparatus (**26**) embodied as a spreader, at least one of said spinning beam (**12, 14**) together with the delivery apparatus (**26**), being rotatable (**56, 58**) in a plane extending parallel to the delivery belt;

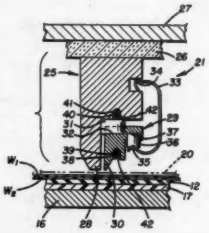
whereby continuous filaments are drawn off under an influence of a gaseous propellant at high speed in a form of a tow (**50**) from said spinnerets and after passing through said filament draw-off device apparatus (**24**) are laid down by means of said delivery apparatus (**26**) on said delivery belt (**28**) for forming a nonwoven fabric.

4,999,081

CUTTING AND HEAT SEALING DIE ASSEMBLY

Bradley H. Buchanan, Ross, Calif., assignor to Float Machines Inc., Novato, Calif.

Filed Oct. 11, 1989, Ser. No. 420,541
Int. Cl.[5] B32B *31/18*
U.S. Cl. 156—515 19 Claims



1. In an apparatus for forming an article out of a pair of superimposed heat-sealable panels comprising

conveyor means for moving a pair of superimposed webs along a path, and

a cutting and sealing station positioned adjacent to said path for receiving said webs, said cutting and sealing station comprising

cutting means, including a cutting die, for simultaneously cutting said webs at a predetermined cutting temperature to form said panels,

sealing means, including a sealing die, for sealing said panels together at a predetermined sealing temperature, less than said cutting temperature,

retaining means for attaching said cutting means to said sealing means and for permitting thermal expansion and movement of said cutting die, relative to said sealing die, and

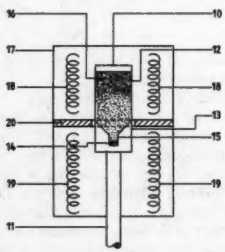
first insulation means for mounting said cutting die on said sealing die and for thermally insulating said cutting die from said sealing die.

4,999,082

PROCESS FOR PRODUCING MONOCRYSTALLINE GROUP II-IV OR GROUP III-V COMPOUNDS AND PRODUCTS THEREOF

Russell E. Kremer, Woodland Park, and David M. Francomano, Colorado Springs, both of Colo., assignors to Akzo America Inc., New York, N.Y.

Filed Sep. 14, 1989, Ser. No. 406,987
Int. Cl.[5] C30B *11/04*
U.S. Cl. 156—605 21 Claims



1. A process for producing monocrystalline Group II-VI or Group III-V compound from the polycrystalline form of said Group II-VI or Group III-V compound, said process comprising:

(a) coating the interior surface of a crucible with a powdered solid, said powdered solid having a melting point higher than the melting point of said polycrystalline form of said compound,

(b) placing an amount of Group II-VI or Group III-V polycrystalline compound into said coated crucible,

(c) placing said coated crucible containing said compound into a heating means,

(d) heating said coated crucible containing said compound to produce a melt of said compound within said crucible while maintaining said powdered solid in solid powered form, and

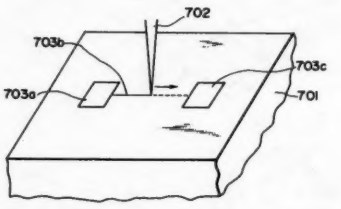
(e) cooling said crucible and said compound to produce a monocrystalline compound.

4,999,083

METHOD OF ETCHING CRYSTALLINE MATERIAL WITH ETCHANT INJECTION INLET

Nobuo Watanabe; Takeo Tsukamoto, both of Atsugi; Toshihiko Takeda, Tokyo; Haruhito Ono, Ashigara, and Masahiko Okunuki, Itsukaichi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 2, 1989, Ser. No. 415,766
Claims priority, application Japan, Oct. 2, 1988, 63-247817; Sep. 29, 1989, 1-255504
Int. Cl.[5] H01L *21/306*
U.S. Cl. 156—628 4 Claims



1. A method of fine working crystalline material, which includes forming an ion injection region in a crystalline material by irradiating a focused ion beam on a predetermined first surface region (A) of said crystalline material and subsequently removing crystalline material beneath said predetermined surface region of said ion injection region by applying a chemical etching treatment, the improvement which comprises the steps of:

performing ion injection under first ion injecting conditions where no removal of said first predetermined surface region (A) occurs even if said first surface region (A) is exposed to an etchant;

forming an injection inlet for said etchant in said crystalline material located at a second surface region adjacent to said first surface region (A);

introducing said etchant from said inlet onto said crystalline material;

causing said etchant to make contact with a high ion concentration region of said ion injected region formed by ion injection under said first ion injection conditions; and

removing said high ion concentration region without removing said first surface region (A) thereby forming a hollow shape in the crystalline material.

4,999,084

METHOD FOR HEAT TREATING SHORT FIBER FRACTIONS AFTER SEPARATION OF THE LONG FIBER FRACTIONS FROM A SECONDARY FIBER MIXTURE

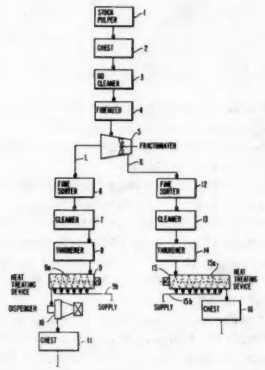
Heinrich Lang, Fronreute-Fronhofen, and Harald Selder, Schlier, both of Fed. Rep. of Germany, assignors to Sulzer-Escher Wyss GmbH, Ravensburg, Fed. Rep. of Germany

Filed Aug. 4, 1989, Ser. No. 389,806

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1988, 3827336

Int. Cl.[5] D21B *1/32;* D21C *5/02*

U.S. Cl. 162—4 14 Claims



1. A method of processing a short fiber fraction, obtained after separating a long fiber fraction from a secondary fiber mixture, comprising the steps of:

subjecting the obtained short fiber fraction to a heat treatment throughout a defined residence time and within a defined temperature range in the absence of mechanically processing said short fiber fraction, to disperse andy wax particles which may be present nd increase the specific volume of the short fiber fraction; and

thereafter and without any further treatment which would alter the fibers by the action of mechanical means, delivering the thus treated short fiber fraction to a machine chest.

4,999,085

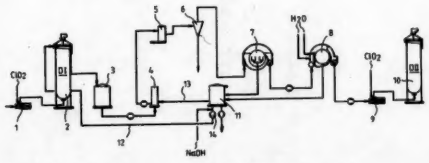
METHOD FOR SCREENING OF DEFIBERED CHLORINE DIOXIDE BLEACHED PULP DURING ALKALINE EXTRACTION

Juhani Luntamo, Pori, Finland, assignor to Sunds Defibrator Rauma Oy, Pori, Finland

Filed Oct. 4, 1988, Ser. No. 252,938

Int. Cl.[5] D21C *9/14;* D21D *5/02*

U.S. Cl. 162—40 19 Claims



1. Method for the screening of defibered pulp in a process wherein defibered defibred pulp is bleached by means of a multi-stage bleaching sequence which includes at least one chlorine dioxide bleaching stage carried out under acidic conditions and a subsequent alkali extraction treatment, comprising:

screening the pulp coming from the acidic chlorine dioxide bleaching stage at the same time as it is extracted with an alkali(14), and further bleaching the screened and extracted pulp in a second bleaching stage, wherein the screening removes fiber knots and impurities from the pulp.

4,999,086

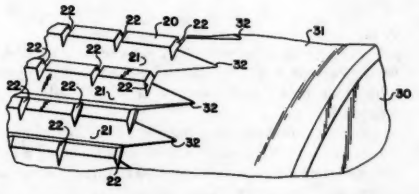
DISPERSION ROLL IN A FOURDRINIER MACHINE

Edmund N. Marx, Jr., 102 E. Weed St., St. Marys, Ga. 31558

Continuation of Ser. No. 390,462, Aug. 4, 1989, abandoned, which is a continuation of Ser. No. 218,969, Jul. 14, 1988, abandoned, which is a continuation-in-part of Ser. No. 158,942, Feb. 22, 1988, abandoned. This application Jun. 4, 1990, Ser. No. 533,941

Int. Cl.[5] D21F *1/20*

U.S. Cl. 162—209 26 Claims



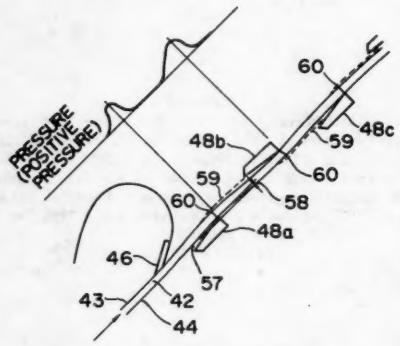
21. In a Fourdrinier process for making paper on a travelling fabric having upper and lower surfaces including a headbox for introducing an aqueous dispersion of fibers onto said fabric, a forming board on which said dispersion spreads out to form a thin uniform layer of said dispersion, suction and dewatering means for removing water from said dispersion to leave a fibrous web on said fabric, and means to remove said web from said fabric and dry said web, at least one elongated roll positioned between said forming board and said suction and dewatering means and in the absence of any cooperating suction box or the like, said roll vibrating said fabric in a direction normal to said surfaces of said fabric, said roll having a length substantially equal to the width of said fabric and being mounted underneath and in contact with said lower surface of said fabric with the longitudinal axis of said roll being perpendicular to the direction of travel of said fabric, said roll having a fluted outer surface of alternating lands and grooves generally parallel to said longitudinal axis, the improvement which comprises spaced end portions of said roll each having for an axial distance of about 13–35% of the outside diameter of said roll a smooth outer surfacesubstantially coextensive with said lands whereby dewatering through said fabric at said end portions is substantially prevented, said roll rotating and producing vibrations having a magnitude of about 0.1–1.0 mm normal to the surface of said roll to occur upon contact of said lands and said end portions with said lower surface of said fabric which tend to agitate said fibers in dispersion and enhance the random orientation of said fibers whereby the paper being produced has more uniform and desirable sheet strength properties in all directions.

4,999,087

TWIN WIRE FORMING APPARATUS WITH POSITIVE PRESSURE FOILS

Masafumi Ebihara, Mihara; Takeshi Akitomo, Hiroshima, and Minoru Nomura, Tokyo, all of Japan, assignors to Research Association for Pulp and Paper Technology, Tokyo, Japan

Continuation of Ser. No. 110,584, Oct. 19, 1987, abandoned, which is a continuation of Ser. No. 783,434, Oct. 3, 1985, abandoned. This application Jun. 12, 1989, Ser. No. 364,531
Claims priority, application Japan, Oct. 3, 1984, 59-207885
Int. Cl.[5] D21F *1/00, 1/54*
U.S. Cl. 162—301 2 Claims



1. A paper web forming apparatus comprising:

a pair of sheets of wires which are substantially parallel to each other and which define a wire line moving together with stock held therebetween in a substantially spaced relationship; and

a plurality of wire supporting members for supporting said wires, said wire supporting members each having a front end and a rear end defining an inner surface facing said wires, said inner surface being substantially free of holes, bumps or dips, said wire supporting members contacting said wires at said rear end thereof at an angle with said wires forming wedge-shaped spaces between said inner surface of said support members and said wires, said wires otherwise being free of contact with said supporting members, said wedge-shaped spaces narrowing in the direction of the movement of said wires forming an apex where said support members contact said wires;

said wedge-shaped spaces formed by said inner surface of said support members and said wires receiving white water oozed from said stock and pushing said white water back into said stock;

said wire supporting members being alternately disposed on both sides of said sheets of wires and having said rear ends pushed in for a distance relative to said wire line, said distance being a distance such that said rear ends are pushed toward the wires such that said members alternately push or direct said white water oozed into said wedge-shaped spaces back into said stock, said supporting members each having a side downstream of the wire contacting rear ends thereof which side is generally perpendicular to the pair of sheets of wires,

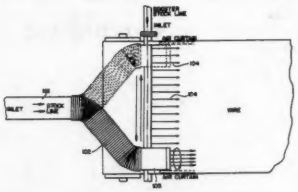
whereby, along with movement of said sheets of said wires, said stock held therebetween is compressed by said support members and by wire tension so as to repeatedly ooze said white water to wet the wires, said white water thus oozed being pushed back into said stock by action of said wedge-shaped spaces thereby obtaining a high quality formation web by wavering said stock held between said sheets of wires.

4,999,088

NO-BOX SYSTEM WITH BOOSTER HEAD SPRAY FOR DELIVERING PAPER STOCK TO A PAPER MACHINE

Tim Tikkanen, Apt. 1008 Minerva, Benalmadena, Malaga, Spain

Continuation-in-part of Ser. No. 341,843, Apr. 24, 1989, abandoned. This application Jul. 17, 1989, Ser. No. 380,375
Int. Cl.[5] D21F *1/00*
U.S. Cl. 162—317 4 Claims



1. An apparatus for making paper comprising:

a. a pair of rollers horizontally aligned,

b. an endless wire-mesh belt trained over the rollers, the belt having an upper top surface.

c. means for driving one of the rollers so that the top surface of the belt goes in a first direction,

d. a first pressurized conduit for delivering paper fiber stock to the belt, the first conduit being disposed above the belt and terminating in first nozzle means spaced above the belt and adapted to disperse the stock over the upper top surface of the belt, and

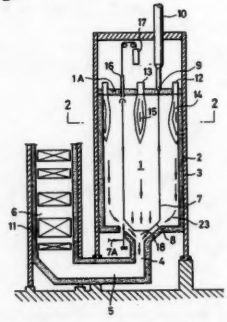
e. a second pressurized conduit having second nozzle means spaced above the belt and delivering stock toward the belt in the same general direction as the first nozzle means, said first and second nozzle means are structured and arranged so that their discharge streams forceably and violently intercept each other at points in the air above the belt and spaced from the first and second nozzle means to break up microagglomerations and spread the stock across the belt.

4,999,089

CRACKING FURNACE

Noriaki Nakase, Urayasu; Mamoru Hokkedo, Yokohama; Etsuji Yamamoto, Ichihara; Masahiko Yoshida, Ichihara, and Yutaka Kitayama, Ichihara, all of Japan, assignors to Mitsui Engineering & Shipbuilidng Co., Ltd. and Mitsui Petrochemical Industries, both of Tokyo, Japan

Filed Sep. 28, 1989, Ser. No. 413,734
Claims priority, application Japan, Sep. 30, 1988, 63-246149
Int. Cl.[5] C10G *9/20*
U.S. Cl. 196—110 5 Claims



1. A cracking furnace for thermal cracking of organic feedstocks, comprising:

a hollow furnace body extending in a longitudinal direction;

a combustion chamber provided in said furnace body;
a combustion gas exit duct communicating with said combustion chamber;
a ceiling provided at an upper part of said combustion chamber;
a central burner provided vertically at the center of the ceiling of said combustion chamber;
side burners provided vertically at both sides of said central burner, respectively;
reaction tubes vertically disposed between said central burner and respective side burners, forming arch bends at a lower part of said combustion chamber, and arranged in vertical rows along the longitudinal direction of the furnace body, wherein said reaction tubes having inlet and outlet ends;
means for feeding the organic feedstock into said reaction tubes through said inlet ends;
a quenching heat exchanger provided above the ceiling at an upper part of said furnace body;
a reaction tube exit header connecting a plurality of outlet ends of said reaction tubes to said quenching heat exchanger; and
a combustion gas flow inducing duct provided at the lower part of the combustion chamber and connected to the exit duct for the combustion gas.

4,999,090

PROCESS FOR PREPARING TRANS-1,4-CYCLOHEXANEDIMETHANOL AND POWDER OF THE SAME

Yoshiaki Tateno, Omiya; Susumu Yoneda, Fuji; Naoki Okamoto, Fuji; Yoshibumi Ishii, Fuji, and Kazuaki Kato, Yoshikawamachi, all of Japan, assignors to Towa Chemical Industry Co., Ltd., Tokyo, Japan

Filed Jul. 5, 1989, Ser. No. 375,493

Claims priority, application Japan, Apr. 10, 1988, 1-87991; Aug. 1, 1988, 63-190726; Dec. 27, 1988, 63-327811

Int. Cl.[5] B01D *3/10, 3/34*

U.S. Cl. 203—36 **9 Claims**

1. A process of increasing the purity of trans-1,4-cyclohexanedimethanol recovered from a mixture of cis- and trans-1,4-cyclohexanedimethanol, comprising the steps of:
distilling at a temperature of about 150° to 200° C. and under a reduced pressure of 1 to 50 mm Hg a heating mixture of cis- and trans-1,4-cyclohexanedimethanol in the presence of an alkali;
recovering, as the distillate a trans-1,4-cyclohexanedimethanol product from the distilling step, cooling said product to a solid, and subsequently pulverizing said solid to a powder, wherein said product comprises at least 80% of trans-1,4-cyclohexanedimethanol.

6. A process of increasing the purity of trans-1,4-cyclohexanedimethanol recovered from a mixture of cis- and trans-1,4-cyclohexanedimethanol, comprising the steps of:
heating at a temperature of about 150° to 250° C. a mixture of cis- and trans-1,4-cyclohexanedimethanol in the presence of alkali, to obtain a first product which is predominantly trans-1,4-cyclohexanedimethanol, and
distilling said first product under reduced pressure of 1 to 50 mm Hg to obtain a second product, as the distillate cooling said second product to a solid and subsequently pulverizing said solid to a powder, wherein said second product comprises at least 80% of trans-1,4-cyclohexanedimethanol.

4,999,091

COATING PROCESS AND COMPOSITION

Andrew Doroszkowski, Marlow; Michael A. Toynton, and Peter Butler, both of Maidenhead, all of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Jun. 22, 1989, Ser. No. 369,937

Claims priority, application United Kingdom, Jul. 6, 1988, 8816057; Mar. 17, 1989, 8906199

Int. Cl.[5] C25D *5/00, 13/06*

U.S. Cl. 204—14.1 **11 Claims**

1. A process for coating an article simultaneously with a metal and a film-forming polymer which comprises passing an electric current at a current density of 1 to 35 milliamps cm^{-2} between the article as a cathode and a counter-electrode immersed in an aqueous coating composition having an inherent pH of 2.5 to 9.5, comprising:
(a) an emulsion in an aqueous carrier of film-forming polymer selected from the group consisting of epoxy resins, alkyd resins, polyurethane resins, acrylic resins and polyester resins having steric stabilizing units comprising a non-ionic hydrophilic moiety derived from a polymer which comprising repeating oxyethylene units of molecular weight between 1,000 to 2,500 and being free from ionic stabilizing units, the emulsion being one which has a critical coalescence value more negative than −0.3 units, and
(b) at least 0.06% by weight based on the total composition of one or more zinc, cadmium, cobalt, iron or nickel salts such that the emulsion has a critical coalescence temperature of 35° to 95° C.

4,999,092

TRANSPORTING A LIQUID PAST A BARRIER

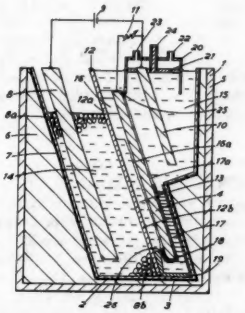
Derek J. Fray, Cambridge, England, assignor to Metallurg, Inc., New York, N.Y.

Filed Mar. 20, 1989, Ser. No. 325,441

Claims priority, application United Kingdom, Mar. 29, 1988, 8807411

Int. Cl.[5] C25C *3/04, 3/02, 3/24*

U.S. Cl. 204—68 **20 Claims**



1. A method of transporting a liquid A past a barrier, the method comprising: providing liquid A on both a first and a second side of the barrier, the liquid A on the first side being in hydrostatic communication with that on the second side both over and under the barrier, and liquid A on at least the second side of the barrier containing a solute S, solute S being a metal and solute S being such that increasing the concentration of solute S in liquid A either (a) increases or (b) decreases the density of the solution; and introducing solute S into liquid A on the first side of the barrier and removing solute S from liquid A on the second side of the barrier, whereby to cause passage of liquid A around the barrier, with S-rich liquid A from the first side passing under the barrier and S-depleted liquid A from the second side passing over the barrier in case

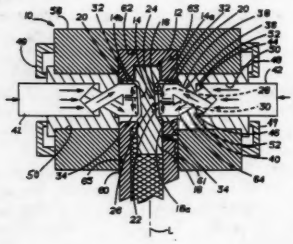
(a), and S-rich liquid A from the first side passing over the barrier and S-depleted liquid A from the second side passing under the barrier in case (b).

4,999,093

ELECTROCHEMICAL MACHINE ELECTRODE ASSEMBLY

Donald J. Moracz, Garfield Heights, Ohio, assignor to Compressor Components Textron Inc., Cleveland, Ohio

Filed May 1, 1989, Ser. No. 345,576
Int. Cl.[5] B23H *9/10, 3/04*
U.S. Cl. 204—129.1 18 Claims



11. In a method for electrochemically machining a workpart having a first surface to be machined and a second surface to be machined which is transverse to the first surface, the steps of:

relatively moving the workpart and an electrode having a primary workface and a secondary workface oriented transverse to the primary workface in a first direction to place the primary workface in a machining position adjacent the first surface of the workpart for machining said first surface, said primary workface comprising first and second electrode portions having a plurality of fingers disposed side-by-side in a contracted position; and

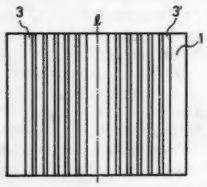
moving the fingers of the first electrode portion and second electrode portion away from one another to expand the primary workface in a direction transverse of the first direction from the contracted position to an expanded position for positioning the secondary workface in a machining position adjacent the second surface of the workpart for machining said second surface.

4,999,094

METHOD FOR MANUFACTURING A COLOR MEMBER

Hitoshi Kamamori; Koji Iwasa; Mitsuru Suginoya; Yutaka Sano; Yumiko Terada, and Naoki Kato, all of Tokyo, Japan, assignors to Seiko Instruments & Electronics Ltd., Japan

Filed Feb. 28, 1985, Ser. No. 706,401
Claims priority, application Japan, Feb. 28, 1984, 59-36785
Int. Cl.[5] C25D *13/06, 13/12*
U.S. Cl. 204—180.2 25 Claims



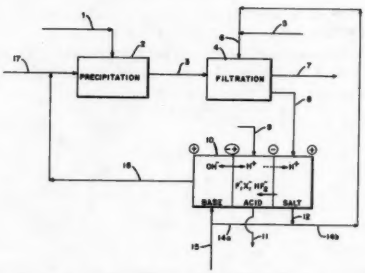
1. A method for manufacturing a color member comprising the steps of: forming a plurality of electrically conductive thin film patterns on an electrically insulative substrate; simultaneously forming a colored layer on said conductive thin films of all of the patterns by simultaneously applying a voltage to the conductive films of all the patterns to simultaneously electrodeposit a coloring material and polymer on said conductive thin films; and cutting the substrate having the colored layer thereon into plural sections each having one of the given patterns.

4,999,095

RECOVERY OF MIXED ACIDS FROM MIXED SALTS

Frederick P. Chlanda, Rockaway, and Krishnamurthy N. Mani, Denville, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation of Ser. No. 729,848, May 3, 1985, abandoned. This application May 16, 1988, Ser. No. 196,829
Int. Cl.[5] B01D *13/02*
U.S. Cl. 204—182.4 15 Claims



1. A process for recovering a mixed acid solution comprising hydrofluoric acid from a solution comprising salts of the acids to be recovered comprising the steps of:

(a) providing an electrodialytic water splitter comprising at least two unit cells, each unit cell comprising a means for splitting water comprising a bipolar membrane or spaced apart anion and cation membranes, a first compartment and a second compartment, said electrodialytic water splitter additionally comprising a single pair of anode and cathode electrodes said at least two unit cells being between the anode electrode and the cathode electrode;

(b) feeding an aqueous solution comprising at least two salts formed from at least two different anions to the first compartment, one of said anions being fluoride anions;

(c) feeding a liquid comprising water to the second compartment;

(d) passing current through said electrodialytic water splitter to produce an aqueous product comprising mixed acids formed from the different anions in the second compartment, and an aqueous salt-containing product comprising a reduced concentration of said anions in the first compartment; and

(e) recovering aqueous product comprising hydrofluoric acid from the second compartment.

4,999,096

METHOD OF AND APPARATUS FOR SPUTTERING

Masayasu Nihei; Jin Onuki; Yasushi Koubuchi; Kunio Miyazaki, all of Hitachi, and Tatsuo Itagaki, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 29, 1988, Ser. No. 213,136
Claims priority, application Japan, Jun. 30, 1987, 62-163092; Mar. 16, 1988, 63-60421
Int. Cl.[5] C23C *14/34*
U.S. Cl. 204—192.3 20 Claims

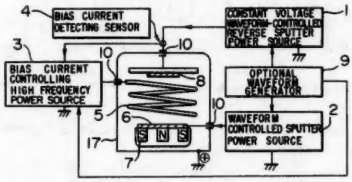
1. A method for depositing a material of a target on a substrate comprising the steps of:

placing the target and the substrate opposing each other in a vacuum chamber;

applying to said target a first negative voltage of a first waveform including a first negative base portion of a first substantially constant negative voltage and a first pulse portion including first pulses each having a first peak more negative than said first constant negative voltage so as to effect sputtering of the target material on said substrate; and

applying to said substrate a second negative voltage of a second waveform including a second negative base portion of a second substantially constant negative voltage and a second pulse portion including second pulses each having a second peak more negative than said first constant negative voltage in such a manner that said second peak is less negative than said first peak and the second pulses do not substantially overlap with the first pulses so as to effect reverse sputtering of the target material deposited on said substrate.

18. An apparatus for forming a thin film of a material of a target on a substrate, said apparatus comprising:


BIAS CURRENT DETECTING SENSOR
CONSTANT VOLTAGE WAVEFORM-CONTROLLED REVERSE SPUTTER POWER SOURCE
BIAS CURRENT CONTROLLING HIGH FREQUENCY POWER SOURCE
OPTIONAL WAVEFORM GENERATOR
WAVEFORM CONTROLLED SPUTTER POWER SOURCE
S N S

means for placing the target and the substrate at positions opposing each other in a vacuum chamber;

means for applying to said target a first negative voltage of a first waveform including a first negative base portion of a first substantially constant negative voltage and a first pulse portion including first pulses each having a first peak more negative than said first constant negative voltage so as to effect sputtering of the target material on said substrate; and

means for applying to said substrate a bias current of a second negative voltage of a second waveform including a second negative base portion of a second substantially constant negative voltage and a second pulse portion including second pulses each having a second peak more negative than said first constant negative voltage in such a manner that said second peak is less negative than said first peak and the second pulses do not substantially overlap with the first pulses so as to effect reverse sputtering of the target material deposited on said substrate.

4,999,097

APPARATUS AND METHOD FOR THE ELECTROLYTIC PRODUCTION OF METALS

Donald R. Sadoway, Belmont, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 255,099, Jul. 28, 1988, abandoned, which is a continuation-in-part of Ser. No. 657, Jan. 6, 1987, abandoned. This application Jul. 20, 1989, Ser. No. 383,321

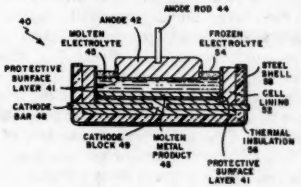
Int. Cl.[5] C25C *3/08*

U.S. Cl. 204—243 R **31 Claims**

13. An electrolytic cell for the production of a metal product by the electrolytic reduction of an oxide based feed material dissolved in a molten electrolyte, said cell comprising a vessel for containing the molten electrolyte, a vessel lining in contact with the electrolyte, an anode and a cathode, wherein the anode consists of a metal or metallic alloy foundation having a protective layer formed upon an oxidizable material, said oxidizable material being such that it forms an oxide product upon its surface when such surface is contacted with the electrolyte, the electrode being such that, at the operating conditions of the cell the protective layer and oxide product:

a. are not substantially reduced by the metal product;

b. are not substantially reactive with the electrolyte to form a material that is reactive with the metal product; and,



c. have an electrochemical potential that is more electronegative than that of the feed material undergoing electrolysis to produce the metal product of the cell.

4,999,098

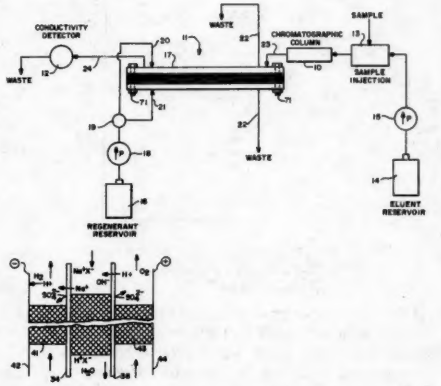
MODIFIED MEMBRANE SUPPRESSOR AND METHOD FOR USE

Christopher Pohl, Union City; Roseanne W. Slingsby, Pleasanton; John R. Stillian, Livermore, and Ryszard Gajek, San Francisco, all of Calif., assignors to Dionex Corporation, Sunnyvale, Calif.

Continuation of Ser. No. 658,148, Oct. 4, 1984, abandoned. This application Mar. 3, 1986, Ser. No. 837,330

Int. Cl.[5] B01D *61/48*

U.S. Cl. 204—301 **22 Claims**



1. Apparatus for ion analysis comprising an eluent reservoir, chromatographic separating means in communication with said eluent reservoir for receiving eluent therefrom, said chromatographic separating means comprising a separating medium adapted to separate ionic species of a sample eluted therethrough using eluent comprising an electrolyte in solution, suppressor means for treating effluent eluted from said chromatographic separating means, said suppressor means including at least on regenerant compartment means and at least one effluent compartment means, an ion exchange membrane sheet partitioning said regenerant compartment means and effluent compartment means and defining therewith a regenerant flow channel and an effluent compartment means

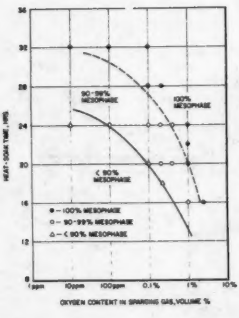
flow channel, respectively, said regenerant including a wall opposed to and extending coextensively with said ion exchange membrane sheet, said effluent compartment means including a wall opposed to and extending extensively with said ion exchange membrane sheet, said ion exchange membrane sheet being preferentially permeable to ions of one charge only, positive or negative, and including exchangeable ions of said one charge, bridging means disposed in said effluent flow channel comprising structure including portions extending substantially across the effluent flow channel, said structure defining continuous convoluted liquid flow-through passages in said effluent flow channel along the length of said bridging means, the external surfaces of said structure including ion exchange sites with exchangeable ions of the same charge as the exchangeable ions of said ion exchange membrane sheet, said bridging means being non-integral with said ion exchange membrane sheets, and detector means suitable for detecting resolved ionic species and communicating with said effluent flow channel to receive the treated effluent therefrom.

4,999,099

PROCESS FOR MAKING MESOPHASE PITCH

Ta-Wei Fu, Ponca City, Okla., and Manfred Katz, Wilmington, Del., assignors to Conoco Inc., Ponca City, Okla.

Filed Jan. 30, 1986, Ser. No. 824,387
Int. Cl.[5] C10C *3/04*
U.S. Cl. 208—39 **15 Claims**


90 - 99% MESOPHASE
100% MESOPHASE
< 90% MESOPHASE
● — 100% MESOPHASE
○ — 90 - 99% MESOPHASE
△ — < 90% MESOPHASE
HEAT - SOAK TIME, HRS
OXYGEN CONTENT IN SPARGING GAS, VOLUME %

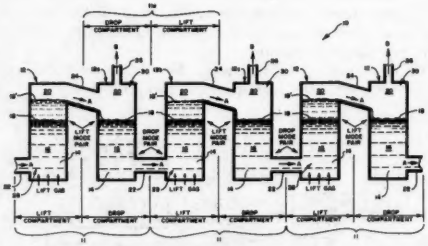
1. In a process for producing a pitch product having a mesophase content of from 50 to 100% by volume and suitable for carbon fiber manufacture, which process comprises heating a carbonaceous feedstock at mesophase-forming temperature while passing a sparging gas therethrough for a time sufficient to produce said pitch product having said mesophase content, the improvement wherein said sparging gas includes an oxidatively reactive gaseous component in an amount (a) sufficient to produce said amount of mesophase content in a shorter time than would be required without said oxidatively reactive gaseous component, and (b) less than that amount which produces a pitch product having a melting point above 400° C. wherein the oxidative reactive gaseous component is selected from the group consisting of oxygen, ozone, hydrogen peroxide, formic acid vapor, hydrogen chloride vapor and mixtures thereof, and wherein sufficient oxidative reactivity is present to equal from 0.1 to 2.0 percent by volume oxygen in the sparge gas.

4,999,100

LOW PROFILE FLUID CATALYTIC CRACKING APPARATUS AND PROCESS

Milton B. Thacker, 1590 Devonshire Dr., Salt Lake City, Utah 84108; John M. Limburg, 671 E. Walnut Brooke Dr., Murray, Utah 84107, and Vincent J. Memmott, 335 W. Willowood Cir., Centerville, Utah 84104

Division of Ser. No. 150,188, Jan. 29, 1988, abandoned, which is a continuation-in-part of Ser. No. 12,285, Feb. 9, 1987, abandoned, and a continuation-in-part of Ser. No. 127,945, Dec. 2, 1987, abandoned. This application Aug. 25, 1989, Ser. No. 399,626
Int. Cl.[5] C10G *51/00, 55/02, 55/06*
U.S. Cl. 208—155 **4 Claims**



1. A method of cracking hydrocarbonaceous feedstock, the method comprising the steps of:

fluidizing a catalyst in a succession of enclosed catalyst cells, each of said catalyst cells housing in the bottom thereof a catalyst reservoir and in the top thereof an atmosphere reservoir, and said cells each being provided with means for separating the space above said catalyst reservoir into a first compartment having an input atmosphere reservoir and a second compartment having an output atmosphere reservoir;

laterally advancing said fluidized catalyst through said succession of catalyst cells in a predetermined flow direction by alternately lifting the fluidized catalyst through each of said second compartment and out of said output atmosphere reservoir, and dropping the fluidized catalyst through said input atmosphere reservoir and into said first compartment, whereby said fluidized catalyst continuously advances in a generally horizontal, sinusoidal flow path through said cells;

fluidizing the catalyst in at least a first one of said successive cells with hydrocarbonaceous feedstock mixed with steam such that said cells serve as a reactor section for cracking said feedstock;

fluidizing the catalyst in a second cell with an oxidizing gas such that said second cell serves as a regenerator section for restoring said catalyst to its active state by combustion of coke to remove the coke from said catalyst; and

fluidizing the catalyst in third and fourth cells with a nonoxidizing gas so as to establish an atmospheric seal to preclude said oxidizing gas in said regenerator section from entering said reactor section, and so as to preclude said feedstock from entering said regenerator section.

4,999,101

PREHEAT INDICATOR

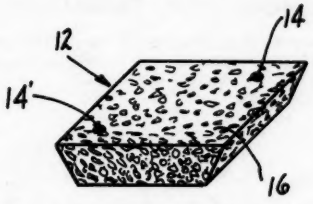
Fereshteh Tadayon, Asheville, N.C., assignor to Alusuisse Lonza-Services Ltd, Zurich, Switzerland

Filed Nov. 2, 1989, Ser. No. 430,595
Int. Cl.[5] B01D *39/14*
U.S. Cl. 210—85 **16 Claims**

1. An indicator for use with a ceramic body for indicating that said body has been substantially uniformly heated to a desired preheat temperature, said indicator comprising:

a visible indicia material applied to a ceramic body, said

material having a burnoff temperature substantially equal to said desired preheat temperature and providing a visible indication when said body has been substantially uniformly heated to said desired temperature.

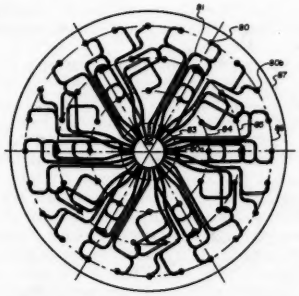


4,999,102

LIQUID TRANSFER MANIFOLD SYSTEM FOR MAINTAINING PLUG FLOW

John R. Cox, Twin Falls, and Edward G. Bulgin, Nampa, both of Id., assignors to The Amalgamated Sugar Company, Ogden, Utah

Filed Dec. 16, 1988, Ser. No. 285,732
Int. Cl.[5] F16L *41/00*
U.S. Cl. 210—137 **6 Claims**



1. An improved liquid transfer manifold system for maintaining an interface between liquid phases within a large scale separator system, including:

a cell of a large scale separator system into which liquid is introduced as separated discrete phases at an inlet zone occupying a first approximately transverse cross-sectional region of said cell whereby to develop a discrete liquid phase plug which migrates approximately longitudinally in a direction normal said first cross-sectional region towards an outlet zone occupying a second approximately transverse cross-sectional region of said cell;

said improved manifold system comprising:

a center well, positioned approximately at the center of one of said transverse cross-sectional regions;

a plurality of approximately hydraulically identical primary conduits, each including a proximal end in open liquid flow communication with said center well and a remote end;

a plurality of intermediate plenums, corresponding in number to said primary conduits, each said intermediate plenum being in open liquid flow communication with a respective said remote end of a respective said primary conduit;

a plurality, corresponding in number to said intermediate plenums, of sets of approximately hydraulically identical secondary conduits, each of said secondary conduits within each respective said set including a proximal end in open liquid flow communication with a respective said intermediate plenum; and

a plurality of groups of liquid passage devices, each said group including a plurality of individual said devices, the total population of said devices being approximately evenly distributed at a plurality of distances from said center well throughout a cross-sectional region of said cell, each said device within each said group being connected through approximately hydraulically identical liquid distribution means to a respective said intermediate plenum;

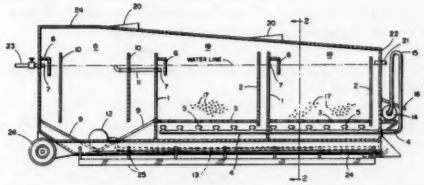
wherein said manifold system provides a multiplicity of approximately hydraulically identical flow paths between said center well and said cell constructed and arranged for simultaneously providing a nearly identical flow rate in each said liquid passage device and maintaining an interface between liquid phases in passage through said manifold system.

4,999,103

DECONTAMINATION APPARATUS MOBILE WATER

John D. Bogart, 310 Belinda Pkwy., Mt. Juliet, Tenn. 37122

Continuation of Ser. No. 131,728, Dec. 11, 1987, abandoned. This application Sep. 25, 1989, Ser. No. 411,267
Int. Cl.[5] C02F *3/20*
U.S. Cl. 210—151 **3 Claims**



1. An apparatus for treatment of industrial, organically-contaminated water supplies using a method of bacterial biodegradation comprising a longitudinally elongated, horizontally disposed tank including end bulkheads, at least two divider baffles oriented vertically and in spaced relation to each other and the bulkheads, each divider baffle being joined with the periphery of the tank to divide the interior of the tank into a primary treatment cell, a secondary treatment and a clarifier cell, said cells being arranged in tandem relation, an inlet for contaminated water in one end bulkhead for supplying contaminated water to the primary treatment cell, said inlet being located adjacent the top of but spaced below the top of the primary treatment cell, an outlet for treated water in the other end bulkhead for discharging treated water from the clarifier cell, said outlet being disposed at the same elevation as the inlet, a plurality of air spargers located in the bottom portion of each of the treatment cells, blower means communicated with said air spargers for discharging air into the bottom portion of each of said treatment cells, each of said divider baffles having a port at the same elevation as the inlet and outlet for communicating said cells, a vertically disposed directional baffle disposed adjacent to but spaced from the end bulkhead having the inlet therein with the upper end disposed above the inlet and the lower end disposed above the bottom of the tank thereby directing flow from incoming contaminated water downwardly toward the bottom of the primary treatment cell for passage below the lower end of the directional baffle, a vertically disposed directional baffle located in the secondary treatment cell and disposed adjacent to but in spaced relation to the divider baffle between the primary and secondary treatment cells with the upper end thereof disposed above the port in the divider baffle and the lower end disposed above the bottom of the tank thereby directing flow from the primary treatment cell into the secondary treatment cell downwardly under the lower end of the directional baffle, a pair of vertically disposed

stilling plates in said clarifier cell, said stilling plates being spaced from each other and spaced from the divider baffle defining the secondary treatment cell and the bulkhead having the outlet therein with the upper end of the stilling plates extending above the ports and the lower end disposed above the bottom of the tank for directing flow through the clarifier cell, each of said divider baffles including a trash block in the form of a plate spaced from the port on the upstream side thereof and extending above and below the port to block flow of surface debris through the ports, said bulkhead having the outlet therein including a trash block in the form of a plate spaced from the outlet and extending above and below the outlet to block flow of surface debris from the outlet, each of said treatment cells including synthetic biomedia in the form of activated bacteria added thereto, and means communicating with the bottom portion of the clarifier cell and the primary treatment cell to return activated bacteria from the clarifier cell to the primary treatment cell.

4,999,104

DISK-TYPE DECKER

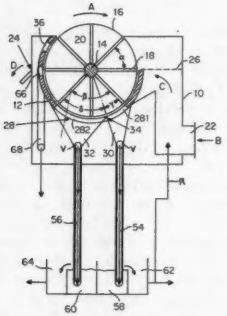
Uwe Krieger, Düren, Fed. Rep. of Germany, assignor to Andreas Kufferath GmbH & Co. and Andreas-Kufferath-Platz, both of Düren-Mariaweiler, Fed. Rep. of Germany

Filed Sep. 15, 1988, Ser. No. 244,708

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1987, 3730990

Int. Cl.[5] B01D *33/23*

U.S. Cl. 210—196 **31 Claims**



1. A disk-type decker comprising: a stationary tub; at least one screen disk mounted in said stationary tub; a horizontal driven shaft, said screen disk being rotatable on said drive shaft for draining a suspension of fibers; at least one suspension chamber opening into said tub; at least one filtrate chamber opening into said tub and adjacent to said suspension chamber; said disk being sealed off at its circumference from the tub and separating said suspension chamber from said filtrate chamber; said suspension chamber having a suspension intake at a first end of said tub, said suspension chamber having a suspension outlet at a second end of said tub; said filtrate chamber having a filtrate outlet in bottom of said tub; said filtrate chamber being divided into a plurality of sections; transverse partitions secured to said driven shaft and sealed off from said tub, said plurality of sections being distributed along the circumference of said screen disk and being mutually sealed off at least below a level of said suspension by said transverse partitions; and a source of vacuum communicating with said filtrate outlet.

4,999,105

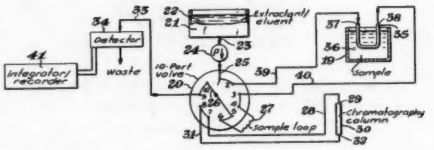
APPARATUS FOR MEMBRANE ASSISTED LIQUID CHROMATOGRAPHY

Richard G. Melcher, and Hernan J. Cortes, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 115,795, Nov. 2, 1987, Pat. No. 4,775,476. This application Aug. 5, 1988, Ser. No. 229,182

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—198.2 **8 Claims**



1. Apparatus for membrane assisted liquid chromatography, comprising:

a means for pumping a liquid;

a membrane having a first side and a second side;

a channel having a first end and a second end, at least a portion of the channel being formed by the first side of the membrane so that the second side of the membrane can be exposed to a sample containing a sample component;

an injection conduit having a first end and a second end for containing a preselected volume of the the liquid;

a liquid chromatography column for chromatographing the sample component, the liquid chromatography column having an inlet port;

a means for switching liquid flow between a first flow pattern and a second flow pattern, the means for switching having distinct ports and being in liquid communication with the means for pumping the liquid, with the first end of the channel, with the second end of the channel, with the first end of the injection conduit, with the second end of the injection conduit, and with the inlet port of the chromatography column at said distinct ports, the first flow pattern being from the pumping through the channel and then through the injection conduit, the second flow pattern being from the same means for pumping as the first flow pattern, through the injection conduit, and then to the inlet port of the liquid chromatography column.

4,999,106

APPARATUS FOR MAGNETICALLY CONDITIONING A LIQUID

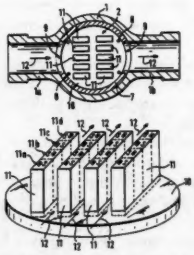
Robert H. Schindler, Bellmund, Switzerland, assignor to Liquitech Holding S.A., Luxembourg

Filed Jun. 16, 1989, Ser. No. 367,444

Claims priority, application Luxembourg, Jul. 22, 1988, 87289

Int. Cl.[5] C02F *1/48*

U.S. Cl. 210—222 **8 Claims**



1. A liquid conditioning element having a magnetic disincrustant action, comprising at least two magnetized inserts

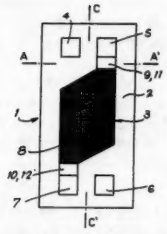
mounted in a pipe containing a liquid to be treated wherein said inserts are disposed parallel to one another and parallel to the direction of flow of the liquid to be treated; wherein each of said inserts comprises a plurality of successive permanent magnets abutting each other which are positioned such that the magnetic flux of each magnet is perpendicular to the direction of liquid flow and the polarity of adjacent magnets of an insert alternates in direction, and wherein each magnet insert is located opposite an identically polarized magnet in an adjacent insert.

4,999,107

SEPARATOR FRAME FOR A TWO-FLUID EXCHANGER DEVICE

Gerard Guerif, Boissy Sous St. Yon, France, assignor to Eurodia S.A., France

Filed Oct. 16, 1989, Ser. No. 421,953
Claims priority, application France, Oct. 17, 1988, 88 15307
Int. Cl.[5] B01D *61/50, 63/08, 69/06*
U.S. Cl. 210—224 **6 Claims**



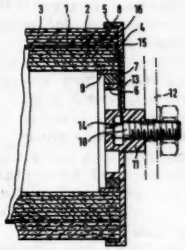
1. An exchanger device for exchanging items between two fluids, said items being contained in at least one of the fluids, the device comprising a stack of exchanger membranes and of separator frames interposed between said membranes, in which each frame is constituted by an impermeable seal plane delimiting an open central portion, the seal planes and the membranes being pierced by orifices, with a first set of orifices constituting ducts for the flow of a first fluid, and with a second set of the orifices constituting ducts for the flow of a second fluid, each seal plane including openings of diffusers which, in every other separator frame, connect the central portion to the orifices of the first set, and in the rest of other separator frames, connect central portion to the orifices of the second set, the diffusers and the central portion of each seal plane including an expanded structure crossing thereon, wherein each separator frame is built up from four thermoplastic sheets and the expanded structure, with two outer sheets being flexible and hollowed out in zones corresponding to the diffusers and with two inner sheets situated on either side of the expanded structure and being semi-stiff, with at least one of them not including an opening over the zones occupied by the diffusers, the four sheets being assembled together by pressure at softening temperature in the entire seal plane except in the zones of the diffusers, such that in each of the zones corresponding to the diffusers the semi-stiff sheet is not assembled to the expanded structure and constitutes a small protective bridge.

4,999,108

FILTER ELEMENT WHICH CONDUCTS STATIC ELECTRICITY

Paul Koch, Oberursel/Taunus, and Klaus Belz, Bad Homburg, both of Fed. Rep. of Germany, assignors to Faudi Feinbau GmbH, Oberursel/Taunus, Fed. Rep. of Germany

Filed May 2, 1989, Ser. No. 352,761
Claims priority, application Fed. Rep. of Germany, Jun. 1, 1988, 3818595
Int. Cl.[5] B01D *46/50*
U.S. Cl. 210—243 **8 Claims**



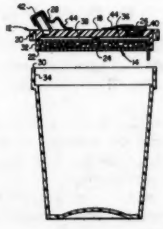
1. A filter element adapted for the filtering of a liquid containing static electricity, said filter element comprising:
a perforated metal support tube,
inner and outer electrically non-conductive filter layers disposed on inner and outer peripheries, respectively, of said tube for filtering the liquid,
a plastic terminal disk having an axial inner surface mounted against axial ends of said support tube and filter layers,
a metal fastener connected to said terminal disk and projecting therefrom, said fastener including a portion embedded in said terminal disk,
a metal wire embedded in said terminal disk and including an exposed radial inner end electrically connected to said fastener, and a radial outer end exposed at said axial inner surface and electrically connected with an end of said support tube, said wire adapted to conduct static electricity in the liquid from said support tube to said fastener, said radial inner end of said wire being held in contact with said fastener solely by virtue of being disposed between said fastener and a surrounding portion of said terminal disk.

4,999,109

FILTERING LID WITH SEPARATE INLET AND OUTLET COMPARTMENTS

Reza A. Sabre, 3716 N. Elm, Denton, Tex. 76201

Filed Aug. 28, 1989, Ser. No. 399,239
Int. Cl.[5] B01D *24/22*
U.S. Cl. 210—244 **9 Claims**



9. A portable water filtering apparatus comprising:
a lid removably engageable with the rim of a drinking cup;
filtering means operatively disposed within said lid, said

filtering means comprising a water filter having at least one layer suitable for removing suspended particulate matter from contaminated water;

retention means for removably securing said filtering means within said lid, said filtering means and said lid being removable from said cup as a unit;

inlet means for providing a first passageway through said lid, said passageway being in fluid communication with said filtering means whereby said contaminated water may be poured through said inlet means and directed into and through said filtering means;

wherein said water filter includes:

a first layer comprising a polyester fiber screen which operates to remove suspended particulate matter from said contaminated water;

a second layer comprising an asbestos fiber screen coated with triiodide resin, which operates to remove suspended particulate matter from said contaminated water and further to purify said contaminated water by killing bacteria contained therein;

a third layer comprising an asbestos fiber screen coated with silver nitrate, which operates to remove suspended particulate from said contaminated water and further to purify said contaminated water by killing bacteria contained therein; and

a fourth layer comprising activated charcoal for removing unpleasant taste and odor from said contaminated water.

4,999,110

REGENERATED CELLULOSE MEMBRANE AND PROCESSES FOR PREPARATION THEREOF

Yoshito Ikada, Uji; Hikaru Konishi; Eugene Corretge, both of Kyoto, and Kazuo Imamura, Nobeoka, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 116,785, Nov. 5, 1987, abandoned. This application Feb. 28, 1990, Ser. No. 488,511

Claims priority, application Japan, Nov. 7, 1986, 61-266473; Oct. 9, 1987, 62-253724

Int. Cl.[5] B01D *69/00*

U.S. Cl. 210—490 **10 Claims**

1. An improved regenerated cellulose membrane characterized in that said membrane is formed by ester-bonding an organic carboxylic acid or a functional derivative thereof to at least a blood-contacting surface of a polymeric membrane comprising a regenerated cellulose; said organic carboxylic acid being at least one member selected from the group consisting of organic monocarboxylic acids and polyethylene glycol dicarboxylic acids.

4,999,111

PROCESS FOR TREATING WASTEWATER

Ronald E. Williamson, Hillsborough, N.C., assignor to Orange Water and Sewer Authority, Carrboro, N.C.

Continuation-in-part of Ser. No. 389,885, Aug. 4, 1989, which is a continuation-in-part of Ser. No. 238,059, Aug. 30, 1988, Pat. No. 4,874,519, which is a continuation-in-part of Ser. No. 201,185, Jun. 2, 1988, abandoned. This application Nov. 28, 1989, Ser. No. 442,598

The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.

Int. Cl.[5] C02F *3/30*

U.S. Cl. 210—605 **5 Claims**

1. An activated sludge wastewater treatment process for removing contaminants and nutrients such as BOD, phosphorus, nitrogen, etc., that includes both sidestream anoxic and anaerobic treatment, comprising:

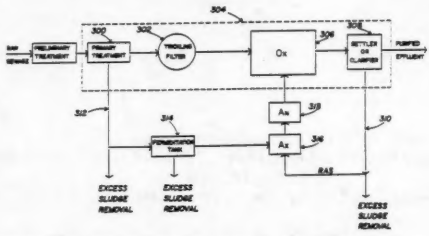
(a) directing raw wastewater influent through a primary clarifier and separating BOD containing settled wastewater from raw sludge;

(b) directing the settled wastewater from the primary clarifier to and through a mainstream treatment process that includes at least one aerobic treatment zone and a final clarifier that separates purified supernatant from settled sludge;

(c) directing the raw sludge from the primary clarifier to a fermenter and fermenting the raw sludge to produce a fermenter supernatant that includes volatile fatty acids;

(d) returning the settled sludge from the final clarifier to a sidestream anoxic treatment area and mixing the fermenter supernatant, including the volatile fatty acids, with the return activated sludge in the anoxic treatment area;

(e) forming conditioned return activated sludge by holding the mixture of return activated sludge and fermenter supernatant in the anoxic treatment area for a selected time period sufficient for microorganisms in the anoxic treatment area to perform a denitrification function;



(f) after denitrification in the sidestream, the process further including subjecting the mixture of return activated sludge and fermenter supernatant to anaerobic treatment for a selected time period in the same sidestream;

(g) and wherein the sidestream anaerobic treatment results in the sidestream production of microorganisms that are capable of biologically removing phosphorus in the wastewater treatment process; and

(h) transferring the conditioned return activated sludge from the sidestream into the mainstream where the conditioned return activated sludge is mixed with the settled wastewater passing from the primary clarifier into the mainstream.

4,999,112

REMOVAL OF THIAMINE MONOPHOSPHATE FROM A SOLUTION OF THIAMINE

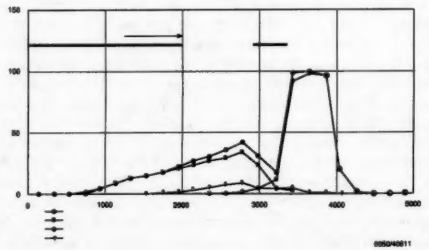
Walter Dobuler, Heidelberg; Wolfgang Schul, Ludwigshafen; Joachim Paust, Neuhofen, and Alfred Mitschker, Odenthal-Holl, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Feb. 21, 1990, Ser. No. 482,836

Claims priority, application Japan, Mar. 2, 1989, 3906632

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—656 **6 Claims**



1. In a process for removing thiamine monophosphate from a solution of thiamine phosphates which contains thiamine monophosphate and cocarboxylase by contacting said solution with a cation exchanger resin and eluting the thiamine mono-

phosphate with an acid and the cation exchanger resin has a pK_a of 1.0–4.5.

4,999,113

SELECTIVE SEPARATION OF THIOCYANATE IONS FROM A SCRUBBING MEDIUM

Günter Weber, Altenmarkt, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 371,135, Jun. 26, 1989, abandoned. This application Nov. 17, 1989, Ser. No. 437,709

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1988, 3821350

Int. Cl.[5] B01J *41/04*

U.S. Cl. 210—664 **21 Claims**

5. A process for the selective removal of thiocyanate ions from an aqueous vanadium-containing and thiocyanate-containing scrubbing solution, comprising passing the solution through an anion exchange column to load the column with thiocyanate ions and continuing passing until the concentration of the thiocyanate ions in the effluent is substantially the same in the effluent as in the scrubbing solution.

4,999,114

METHOD OF TREATING SPENT DRYFILM STRIPPING AND DEVELOPING SOLUTIONS WITH A CHEMICAL MIXTURE

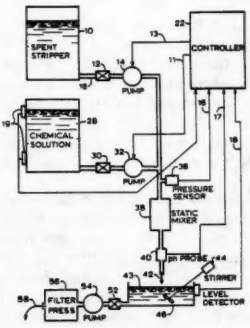
Tat Y. Choo, Dracut, Mass., assignor to Morton International, Chicago, Ill.

Continuation of Ser. No. 300,916, Jan. 24, 1989, abandoned, which is a continuation-in-part of Ser. No. 115,515, Nov. 2, 1987, Pat. No. 4,857,206. This application Feb. 16, 1990, Ser. No. 481,599

The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.

Int. Cl.[5] C02F *1/52*

U.S. Cl. 210—709 **1 Claim**



1. A method of removal of the polymers from spent dryfilm resist stripping solutions and developing solutions, said solutions containing sodium and potassium hydroxide, which comprises the step of:

mixing said spent dryfilm stripping solutions and developing solutions with a chemical mixture dissolved in water, said chemical mixture comprising:

aluminum sulfate and borax where the proportion of borax relative to the total of said mixture is greater than or equal to 0.1% but less than or equal to 25%, where said aluminum sulfate reacts with and neutralizes said sodium and potassium hydroxide forming aluminum hydroxide, sodium and potassium sulfate, and where said aluminum hydroxide, in turn binds to and precipitates out said polymers, measuring the pH of said solutions, and controlling the relative amounts of said chemical mixture and said dryfilm stripping and developing solutions mixed responsive to the measurement to produce a pH ensuring the reaction is complete.

4,999,115

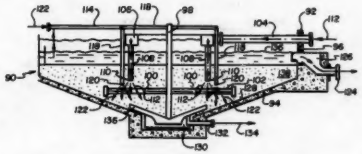
METHOD AND APPARATUS FOR USE IN SEPARATING SOLIDS FROM LIQUIDS

C. Lynn Peterson, Salt Lake City, Utah, assignor to Peterson Filters Corporation, Salt Lake City, Utah

Continuation of Ser. No. 767,351, Aug. 19, 1985, abandoned. This application Feb. 3, 1989, Ser. No. 306,340

Int. Cl.[5] C02F *1/56*

U.S. Cl. 210—728 **28 Claims**



1. A method for use in separating solids from a liquid comprising:

providing a vessel having a bottom and a side wall;

forming a volume of solids and liquids in said vessel and creating an uppermost zone of clarified liquid in an upper portion of the vessel and a lowermost zone of concentrated solids in a bottom portion of the vessel with an intermediate central settling zone therebetween

maintaining said volume of solids and liquids in said vessel substantially constant by controlling the input and output of solids and liquids;

mounting an impeller means and a vertical impeller drive shaft means centrally in said vessel means and providing a vertical central axis of rotation;

said impeller means being mounted on said drive shaft means and extending radially outwardly therefrom and having tip portions defining a circumferential path of travel which is located in the slurry material in the intermediate central settling zone and spaced radially inwardly from the side wall portion of said vessel means and upwardly above the lowermost zone continuously discharging a feed slurry directly into said intermediate central settling zone adjacent said impeller means through slurry feed means; continuously discharging a flocculant mixture through flocculant feed means directly into said intermediate central settling zone adjacent said impeller means and said slurry feed means said impeller means mounted in said intermediate central settling zone directly above said lowermost zone for creating a zone of intense mechanical agitation by rotation at tip speeds of between approximately 300 to 600 feet per minute to create relatively small bead-like floccules for delivery to said lowermost zone;

said slurry feed means comprises a plurality of circumferentially spaced downwardly extending slurry feed pipe means which are radially outwardly spaced a substantial distance from said central axis of rotation and located in said intermediate central settling zone between said shaft means and said tip portions;

said slurry feed pipe means have discharge opening means located in said intermediate central settling zone directly above and adjacent to said impeller means; and

said flocculant feed means comprises a plurality or circumferentially spaced downwardly extending flocculant feed pipe means which are radially outwardly spaced a substantial distance from said central axis of rotation and located between said shaft means and said tip portions.

continuously removing clear liquid through an overflow means located adjacent to a top of said side wall;

continuously allowing said floccules to settle to said bottom;

continuously withdrawing a second slurry comprising said floccules and a liquid from said bottom of said vessel; and

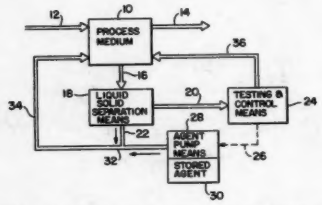
continuously separating said floccules from said liquid.

4,999,116

WASTE WATER TREATMENT METHOD

Gregory S. Bowers, Greer, S.C., assignor to Southern Water Treatment Company, Inc., Easley, S.C.

Division of Ser. No. 205,313, Jun. 10, 1988, Pat. No. 4,923,599.
This application Jan. 8, 1990, Ser. No. 450,411
Int. Cl.[5] C02F *1/62*
U.S. Cl. 210—709 27 Claims



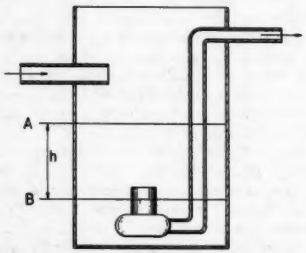
1. A method of waste water treatment, comprising:
conducting pH treatment of a controlled body of waste water for substantially precipitating non-chelated and non-complexed metals therefrom;
sampling such pH-treated waste water, and substantially removing solid precipitated metals therefrom to provide a clear sample;
testing such clear sample for the presence of any remaining metals in solution therein; and
feeding a given precipitating agent to the controlled body of waste water in response to the presence of such remaining metals so as to substantially precipitate same, whereby both pH-precipitated and non-pH-precipitated metals are substantially precipitated from such body of waste water for removal therefrom, with minimized feeding of said precipitating agent.

4,999,117

MONITORING METHOD FOR WASTEWATER PUMP STATION AND COMPATIBLE APPARATUS

Jukka Palmu; Eero Oinonen, both of Vantaa; Leo Numminen, Kaunianen; Jyrki Tolvanen, Helsinki, and Martti Varis, Espoo, all of Finland, assignors to Oy E. Sarlin AB, Helsinki, Finland

Filed Jun. 5, 1989, Ser. No. 361,313
Claims priority, application Finland, Jun. 8, 1988, 882711
Int. Cl.[5] F04B *49/10*; G08B *21/00*
U.S. Cl. 210—744 6 Claims



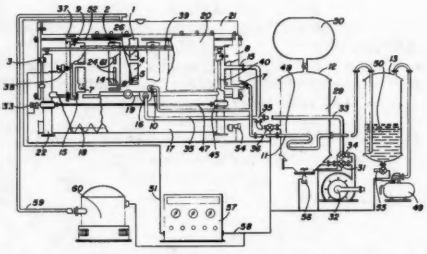
1. A method of monitoring a wastewater pump station performance and output by a monitoring apparatus, wherein said station includes a pump having a run sequence of alternating run and non-run periods, the method comprising the steps of:
determining the time required for the pump to alter a liquid level of said station from a first higher level to a second lower level;
determining the change of volume in said station between said first and second levels;
determining the liquid level rate-of-rise caused by inlet flow into said station during a non-run period of said pump;
determining an output value for said pump from said determined time, determined volume, and said determined rate-of-rise;
comparing said determined output value with a reference output value to obtain a deviation; and
taking corrective action at said station in response to said deviation.

4,999,118

METHOD FOR DEWATERING AND DRYING A LIQUID/SOLID SLURRY AND AN APPARATUS FOR USING THE METHOD

Beltcho A. Beltchev, Sofia, Bulgaria, assignor to Bulgarska Industrialna Stopanska Associatia, Sofia, Bulgaria

Continuation-in-part of Ser. No. 910,904, Sep. 24, 1986, abandoned. This application Oct. 31, 1988, Ser. No. 265,194
Int. Cl.[5] B01D *25/168*
U.S. Cl. 210—771 2 Claims



1. A method of dewatering and drying of a slurry liquid/-solid mass comprising the steps of
compressing the slurry mass under pressure and feeding it into a reception chamber defined by a solid frame and having a confronting heating membrane and a porous partition;
forming vacuum in said reception chamber to draw the liquid component of said slurry mass through said porous partition;
effecting maximum dewatering under the action of pressure and vacuum; thereafter heating said heating membrane to form a "steam jacket" around said heating membrane, thereby extracting through said porous partition the residual liquid and said "steam jacket" from said slurry mass and discharging the separated solid component of said slurry mass from said reception chamber.

4,999,119

ALCOHOL RESISTANT AQUEOUS FILM FORMING FIREFIGHTING FOAM

Edward C. Norman, Chester Springs, and Anne C. Regina, Coatesville, both of Pa., assignors to Chubb National Foam, Inc., Lionville, Pa.

Filed Jul. 20, 1989, Ser. No. 383,141
Int. Cl.[5] A62D *1/02, 1/04*
U.S. Cl. 252—3 11 Claims

1. A firefighting composition concentrate which comprises:
perfluoroalkyl surfactants, a solvent and an effective amount of alkyl polyglycoside sufficient to permit a reduction in the concentration of the perfluoroalkyl surfactant without loss of firefighting performance by the composition, said alkyl polyglycoside present in amount of between about 1.0 to 10.0% by weight.

4,999,120

AQUEOUS EMULSION FINISH FOR SPANDEX FIBER TREATMENT COMPRISING A POLYDIMETHYL SILOXANE AND AN ETHOXYLATED LONG-CHAINED ALKANOL

Paul D. Seemuth, Greenville, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 26, 1990, Ser. No. 484,971
Int. Cl.[5] D06M *15/53, 15/643;* D02J *3/18*
U.S. Cl. 252—8.6 6 Claims

1. An aqueous emulsion finish, particularly suited for use on spandex fibers, comprising 50 to 95 weight percent water and 50 to 5 percent solids, the solids consisting essentially of 80 to 99.5% polydimethylsiloxane and 20 to 0.5% of an ethoxylated alkyl alcohol having a number average molecular weight of at least 800, and a chemical formula

$$H(CH_2)_n—O—(CH_2CH_2O)_p—H$$

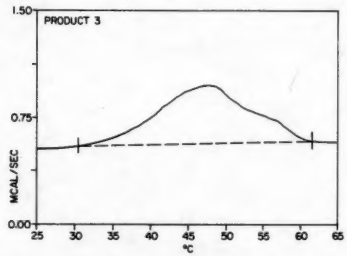
wherein the subscript n is at least 30 and the subscript p is at least 10.

4,999,121

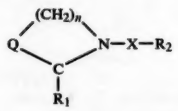
METHOD FOR PREPARING TEXTILE TREATMENT COMPOSITIONS: ADDING MOLTEN SOFTENING AGENT TO AQUEOUS ACID SOLUTION

Franciscus De Block, Merchtem; Maurizio Marchesini, Brussels, and Raphaël Ceulemans, Kessel-Lo, all of Belgium, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Nov. 15, 1988, Ser. No. 271,568
Claims priority, application United Kingdom, Nov. 18, 1987, 8727038; Jul. 5, 1988, 8815974
Int. Cl.[5] C11D *1/40, 3/30;* C09K *3/16;* D06M *13/34*
U.S. Cl. 252—8.8 23 Claims



1. A process for the preparation of a pourable, pumpable, stable concentrated composition containing from about 10% to about 40% by weight of a softening agent of the formula:



(I)

wherein n is 2 or 3, R_1 and R_2 are, independently, a C_8–C_{30} alkyl or alkenyl group, Q is CH or N,

$$X \text{ is } —R_4—T—\overset{\overset{O}{\|}}{C}—$$

wherein T is O or NR_5, R_5 being H or C_1–C_4 alkyl, and R_4 is a divalent C_1–C_3 alkylene group or $(C_2H_4O)_m$, wherein m is a number of from about 1 to about 8; or X is R_4, that said process comprising the steps of:

(a) adding a Bronstedt acid or an aqueous solution thereof to water at a temperature of from about 50° C. to about 100° C., the quantity of said Bronstedt acid not exceeding about 90% of the total quantity Bronstedt acid to be used in steps (a) and (c), said total quantity of Bronstedt acid being from about 1% to about 50% of the softening agent of formula I;

(b) Injecting into the solution of step (a), a melt at a temperature higher than about 75° C. containing the softening agent of formula I;

(c) Concurrently with step (b), gradually injecting into the solution of step (a), the remaining quantity of Bronstedt acid;

(d) Adding a compound selected from the group of polyols, mono- and poly-hydroxy acids and salts thereof, ethoxylated amines and mixtures thereof, and amino-acids in an amount of from about 3% to about 30% of the softening agent of formula I; and

(e) Adding a water-insoluble perfume composition, the quantity of said perfume composition being from about 2% to about 15% of the softening agent of formula I;

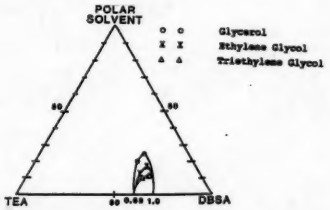
said composition having a viscosity of from about 20 to about 500 cps when it is substantially free of added water-soluble ionizable salts.

4,999,122

NON-AQUEOUS LAMELLAR LIQUID CRYSTALLINE LUBRICANTS

Frances E. Lockwood, The Woodlands, Tex.; James G. Lazar, Mountainview, Calif., and Clarence M. Comer, Spring, Tex., assignors to Pennzoil Products Company, Houston, Tex.

Filed Dec. 30, 1988, Ser. No. 292,458
Int. Cl.[5] C10M *137/02, 141/06*
U.S. Cl. 252—32.5 13 Claims



1. A non-aqueous liquid lubricant composition exhibiting lamellar liquid crystalline properties, consisting essentially of

(a) an organic acid component selected from the group consisting of alkyl phosphonic acids, aryl phosphonic acids, alkyl sulfonic acids and aryl sulfonic acids, or a salt thereof;

(b) an organic amine component selected from the group consisting of ethanolamine, diethanolamine, triethanolamine, ethyldiethanol amine, tallow amine, n-dodecyl-1,3-diaminopropane, n-oleyl-1,3-diaminopropane and n,n-dimethyl aminothioethers; and

(c) a non-aqueous solvent which maintains liquid crystalline properties of a mixture of components (a) and (b),

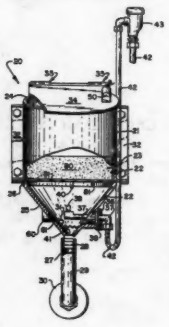
the weight ratios of components (a), (b) and (c) being such that the composition exhibits lamellar liquid crystalline properties, (a)/(b) is the range of about 1:1 to about 5:1, and component (c) comprises not greater than about 75 weight percent of components (a), (b) and (c) combined.

4,999,123
Patent Not Issued For This Number

4,999,124
SOLID BLOCK CHEMICAL DISPENSER FOR CLEANING SYSTEMS

James L. Copeland, Burnsville, Minn., assignor to Ecolab Inc., St. Paul, Minn.

Continuation of Ser. No. 52,798, May 21, 1987, abandoned, which is a division of Ser. No. 796,017, Nov. 6, 1985, Pat. No. 4,690,305. This application Sep. 29, 1989, Ser. No. 415,412
Int. Cl.[5] C11D *17/00;* **A47L** *15/44;* **B67D** *5/02;* **D06F** *39/02*
U.S. Cl. 252—90 **8 Claims**



1. A solid, water soluble rinse aid contained in a vessel for insertion into and dilution within a dispenser having a support for the rinse aid, said article comprising:

(a) a three-dimensional, solid, orthogonal block of rinse aid comprising:
  (i) 20 to 40% by weight polyakylene glycol hardening agent having a M.W. of about 8000;
  (ii) 10 to 30% by weight anionic hydrotrope and
  (iii) 40 to 60% of an nonionic agent; and

(b) an orthongonal vessel having an open face and a leading edge, the vessel surrounding and in contact with the block of rinse aid on all but one surface thereof, the cross-sectional area of the open face sufficient to allow passage of the entire block of rinse aid therethrough, wherein prior to placing the solid, orthogonal block of rinse aid into the dispenser, the block of rinse aid can be separated from the vessel and inserted into the dispenser and retainably held by the support at a constant distance above the spray nozzle.

4,999,125
GRANULES OF A DETERGENT COMPONENT COATED WITH AN ORGANOPHILIC CLAY

Howard Goodman, St. Austell, United Kingdom, assignor to ECC International Limited, United Kingdom

Filed Mar. 26, 1990, Ser. No. 499,166
Claims priority, application United Kingdom, Mar. 31, 1989, 8907346
Int. Cl.[5] C11D *7/42, 17/08, 17/06, 7/20*
U.S. Cl. 252—90 **19 Claims**

1. A granular chemical reagent selected from the group consisting of an enzyme, a bleaching reagent, a bleach activator, an optical brightening agent or a mixture of two or more of the aforesaid for use in a granular detergent composition, the surfaces of the granules of the chemical reagent being provided with a coating in an amount sufficient to delay release of the chemical reagent, at least 0.1% by weight, comprising an organophilic clay mineral prepared by treating a clay mineral with a quaternary ammonium compound having at least one higher alkyl group containing from 10 to 24 carbon atoms or with an organic amine having at least one higher alkyl group containing from 10 to 24 carbon atoms.

4,999,126
FUMED SILICA AS A PAINT STRIPPER THICKENER

Robert J. Meade, Naperville, Ill., assignor to Nalco Chemical Company, Naperville, Ill.

Filed Aug. 1, 1988, Ser. No. 226,481
Int. Cl.[5] C09D *9/00, 9/02*
U.S. Cl. 252—162 **5 Claims**

4. A paint stripper composition consisting essentially of:

Ingredients	% by Weight
BTX aromatic solvent	85–98
Fumed silica having a specific surface area of at least 100 m^2/g	0.5–6
Oil-soluble surfactant having an HLB not greater than 12	1–10

4,999,127

AZEOTROPIC COMPOSITION OF 2-CHLORO-1,1,2-TRIFLUOROETHYL-2-DIFLUOROMETHYL ETHER WITH TRANS-1,2-DICHLOROETHYLENE AND METHNANOL

Abid N. Merchant, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 11, 1989, Ser. No. 448,474
Int. Cl.[5] C11D *7/30, 7/50*
U.S. Cl. 252—171 9 Claims

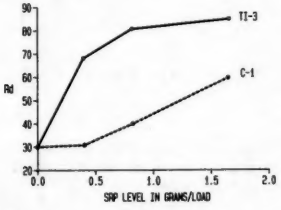
1. An azeotropic composition consisting essentially of from about 24 to 34 weight percent 2-chloro-1,1,2-trifluoroethyl-difluoromethyl ether, from about 54 to 74 weight percent trans-1,2-dichloroethylene and from about 4 to 10 weight percent methanol, said azeotropic composition having a boiling point of about 42.2°+1.1° C. at substantially atmospheric pressure.

4,999,128

SOIL RELEASE POLYMERS HAVING IMPROVED PERFORMANCE, STABILITY AND ECONOMY

Gerard G. Sonenstein, Piscataway, N.J., assignor to Colgate-Palmolive Co., Piscataway, N.J.

Filed Jun. 1, 1989, Ser. No. 359,821
Int. Cl.[5] C08F *20/30;* C11D *3/37*
U.S. Cl. 252—174.14 58 Claims



30. A soil release promoting built laundry detergent composition comprising

a detersively effective amount of at least one surfactant selected from the group consisting of water-soluble nonionic surface active agents and mixtures of anionic and nonionic surface active agents;

a detergent building effective amount of at least one water-soluble or water-dispersible detergent builder; and

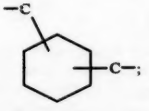
a soil release promoting amount of substantially water-soluble soil release promoting polymer of the formula

$$-\{\{AR-A\}_a\{AR-B\}_b\}_N-$$

wherein each moiety AR of the polymer is independently selected from acid residues of carboxylic acids having at least two carboxylic acid groups;

A is the moiety $-CnH_2n(OCnH_2n)_{x-1}$;

B is the moiety $-CmH_2m-$ or the moiety



x is a number from about 12 to about 410; inclusive;

n is a number of from 2 to 4, inclusive;

m is a number of from 2 to 4 inclusive;

a+b=1.00;

a is a number of from about 0.20 to about 0.50, inclusive; and

N is an integer such that the weight average molecular weight of the polymer is from about 6,000 to about 40,000;

with the proviso that at least 50% of the total acid residues of carboxylic acids having at least two carboxylic acid groups are terephthalic acid residues; and

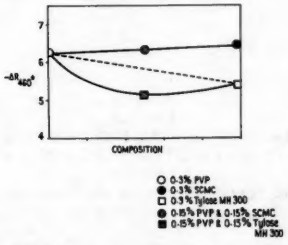
with the further proviso that, when B is $-CmH_2m-$, at least 10% of the total acid residues of carboxylic acids having at least two carboxylic acid groups are a single isomeric form of a carboxylic acid having at least two carboxylic acid groups which is other than terephthalic acid.

4,999,129

PROCESS AND COMPOSITION FOR WASHING SOILED POLYESTER FABRICS

Michael Hull, Windcliffe, Alvanley Road, Helsby, via Warrington WA6 9PS, United Kingdom

Continuation of Ser. No. 74,737, Jul. 17, 1987, abandoned. This application Mar. 6, 1989, Ser. No. 319,934
Claims priority, application United Kingdom, Jul. 30, 1986, 8618635
Int. Cl.[5] C11D *3/22, 3/28, 3/37*
U.S. Cl. 252—174.17 4 Claims



1. A process for removing soil from a polyester fabric and reducing the redeposition of removed soil comprising washing said fabrics in a detergent composition comprising

(a) from 5% to 90% by weight of a synthetic detergent active;

(b) a vinyl pyrrolidone polymer having a molecular weight of from 15,000 to 50,000; and

(c) a nonionic cellulose ether selected from the group consisting of alkyl and alkyl/hydroxyalkyl cellulose derivatives wherein the alkyl group has from 1 to 4 carbon atoms and the hydroxyalkyl group has from 2 to 4 carbon atoms, and

wherein the ratio of the vinyl pyrrolidone polymer to the nonionic cellulose ether is within the range 8:2 to 2:8 and the total level of the vinyl pyrrolidone polymer and the nonionic cellulose ether is within the range from 0.1% to 5% by weight.

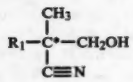
4,999,130

OPTICALLY ACTIVE COMPOUND, PROCESS FOR PRODUCING SAME AND LIQUID CRYSTAL COMPOSITION CONTAINING SAME

Hiroyuki Nohira, Urawa; Takashi Kimura, Utsunomiya; Tetsuya Abe, Kitaibaraki; Yoko Yamada, Atsugi, and Kazuhige Yamagishi, Kusatsu, all of Japan, assignors to Canon Kabushiki Kaisha and Yamakawa Chemical Industry Co., Ltd., both of Tokyo, Japan

Continuation of Ser. No. 269,616, Nov. 10, 1988, abandoned. This application Aug. 27, 1990, Ser. No. 572,301
Claims priority, application Japan, Nov. 11, 1987, 62-283079; Feb. 23, 1988, 63-038617
Int. Cl.[5] C09K *19/52;* C07C *31/34*
U.S. Cl. 252—299.01 8 Claims

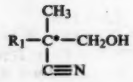
1. An optically active 2-cyano-2-methyl-1-alkanol represented by the formula:



[2]

wherein R_2 denotes an alkyl group having 2–10 carbon atoms, and C* denotes an asymmetric carbon atom.

2. A liquid crystal composition, comprising a mesomorphic compound and an optically active 2-cyano-2-methyl-1-alkanol represented by the formula:



[2]

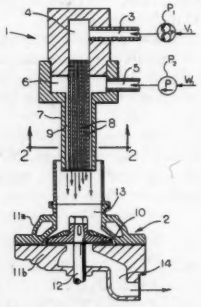
wherein R_2 denotes an alkyl group having 2–10 carbon atoms, and C* denotes an asymmetric carbon atom.

4,999,131

METHOD AND APPARATUS FOR THE PREPARATION OF A WATER BASED DISPERSION OF A VISCOUS LIQUID

Koji Shimizu; Toyohiko Yamadera, and Mitsuo Hamada, all of Ichihara, Japan, assignors to Toray Silicone Company Ltd., Tokyo, Japan

Filed Feb. 7, 1989, Ser. No. 307,641
Claims priority, application Japan, Feb. 10, 1988, 63-27665
Int. Cl.[5] B01J *13/00*; B01F *5/06*
U.S. Cl. 252—314 **6 Claims**



1. A method for the preparation of a water-based dispersion of a viscous liquid, said method consisting of steps in which, along with water, the viscous liquid, having a viscosity within the range of 2 to 5000 centistokes at 25° C. is supplied to a colloid mill by forced discharge and down flow in the form of a plural number of threads, strands, or columns from a plural number of small holes or orifices, said water is forcibly discharged as a film which flows down in such a manner that it encircles the circumference of the viscous liquid discharged in thread, strand or column form and said viscous liquid, encircled by water, is then processed into microparticulate form by the colloid mill.

4,999,132

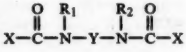
POLYESTERAMIDE DISPERSING AGENT

Giuseppe Canestri, Rastignano, Italy, assignor to Bergvik Kemi AB, Sweden

Continuation of Ser. No. 818,352, Jan. 13, 1986, abandoned. This application Feb. 5, 1988, Ser. No. 152,800
Claims priority, application Italy, Jan. 15, 1985, 12001 A/85
Int. Cl.[5] B01F *17/30, 13/00*
U.S. Cl. 252—356 **5 Claims**

1. A dispersing agent for dispersing solid particles in an organic liquid having a composition comprising:

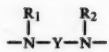
a. a polyesteramide of the formula



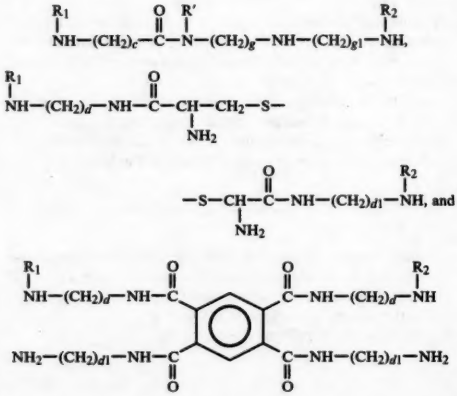
wherein

is the residue of a polyester chain having a molecular weight of at least 1700, derived from an aliphatic hydroxycarboxylic acid containing 16–22 carbon atoms;

wherein

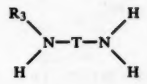


is the residue of an amide which is amino terminated on both ends, selected from the group consisting of monoamides and polyamides of the formula



wherein R1, R2, and R′ are individually and independently selected from the group consisting of hydrogen, alkyl and alkenyl containing up to 20 carbon atoms, c is from 4 to 12, d and d_1 are individually and independently from 2 to 12, g and g_1 are individually and independently from 1 and 4, and

b. a salt of a carboxylic acid and a diamine, said carboxylic acid containing 8–18 carbon atoms, and said diamine having the formula:



wherein T is selected from alkylene, alkenylene, oxygen-bridged alkylene, oxygen-bridged alkenylene, nitrogen-bridged alkylene and nitrogen-bridged alkenylene containing 2–12 carbon atoms, and R_3 is hydrogen, alkyl, or alkenyl containing up to 20 carbon atoms, said salt existing in equilibrium with said carboxylic acid and said diamine and said polyesteramide being a major part of said composition.

4,999,133

PROCESS FOR THE PRODUCTION OF SYNTHESIS GAS

David L. Banquy, Paris, France, assignor to Foster Wheeler USA Corporation, Perryville Corporate Park, N.J.

Continuation of Ser. No. 161,296, Feb. 24, 1988, Pat. No. 4,888,130, which is a continuation of Ser. No. 502,985, Jun. 10, 1983, abandoned, which is a continuation-in-part of Ser. No. 70,671, Aug. 29, 1979, abandoned, which is a continuation-in-part of Ser. No. 934,075, Aug. 16, 1978, abandoned, which is a continuation-in-part of Ser. No. 810,209, Jun. 27, 1977, abandoned. This application Dec. 7, 1989, Ser. No. 447,166

Claims priority, application France, Mar. 22, 1977, 77 08459

The portion of the term of this patent subsequent to Dec. 18, 2006, has been disclaimed.

Int. Cl.[5] C01B *3/26*

U.S. Cl. 252—373 **7 Claims**

1. A process for producing, from a desulfurized hydrocarbon-containing feedstock, a synthesis gas having essentially the stoichiometric composition required for methanol synthesis and low CO_2 content, consisting essentially of:

(a) dividing said feedstock into two fractions, the first fraction representing 30 to 95 per cent of the total feedstock,

(b) subjecting the first fraction from (a) to a primary steam reforming reaction under a pressure higher than 40 atmospheres, by mixing said fraction with steam, and heating the mixture thereof by indirect heat exchange, in the presence of a reforming catalyst, to form a gaseous effluent including hydrogen to a temperature between 700° and 850° C.,

(c) preheating the second fraction from (a), by indirect heat exchange, to a temperature such that, after mixing said fraction with the gas effluent from (b) in the subsequent step, the mixture thereof is at a minimum temperature of 600° C.,

(d) combining effluent gas streams from (b) and (c) to obtain a gas mixture at a minimum temperature of 600° C. and containing a minimum of 35 per cent methane equivalent,

(e) providing a free oxygen-rich gas,

(f) reacting in a single step the gas mixture from (d) with the oxygen rich gas from (e) in a single stage secondary reforming reactor operating under essentially adiabatic conditions, and consisting essentially of a gas mixing zone and a reaction zone, the total amount of free oxygen injected in said mixing zone constitutes the total amount of free oxygen supplied in the process for reaction with the combined effluent gas stream mixture from (d) to produce the synthesis gas and being sufficient to initiate therein the partial oxidation reaction, and the mixing of the reacting gases in said mixing zone being accomplished through a mixing apparatus designed to obtain quasi-instantaneously a homogeneous mixture before the partial oxidation reaction proceeds significantly, and said reaction zone containing a single bed of catalyst or catalysts, whereby the total homogeneous mixture is passed only once through the whole catalyst bed thus producing a synthesis gas containing a per cent methane equivalent of less than one-tenth of that of the gas mixture from (d), and a CO_2 content of less than 8 per cent by volume.

4,999,134

ZINC SALTS, LEAD SALTS AND/OR CALCIUM SALTS OF CARBOXYLIC ACIDS AND THEIR USE AS CORROSION INHIBITORS

Egon Liedek, Esslingen, and Gerhard Haegele, Stuttgart, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 23, 1988, Ser. No. 248,085

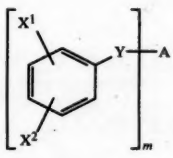
Claims priority, application Fed. Rep. of Germany, Sep. 25, 1987, 3732374

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.[5] C07D *211/00*

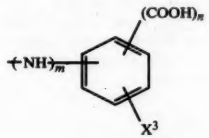
U.S. Cl. 252—389.51 **20 Claims**

1. A zinc salt, lead salt or calcium salt, or a mixed salt containing two or three of these metals, of a carboxylic acid of the formula



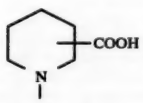
(I)

where A is a radical of the formula



(II)

or



(III)

Y is —CO—or —SO_2—, X^1 is C_1–C_8—alkyl, C_1–C_8—alkoxy or halogen, X^2 is hydrogen, C_1–C_8–alkyl or halogen, X^3 is hydrogen, nitro or halogen, m and n are each 1 or 2, and X^1 may furthermore be hydrogen if A is a radical of the formula (III) or X^3 is nitro or m is 2.

4,999,135

RUST-PROOF SEALING COMPOSITION

Hiroshi Matsuda; Toshiyuki Nitta, and Toshiyuki Aoki, all of 2184, Oaza Shimoono, Sowamachi, Sarushima-gun, Ibaraki-ken, Japan

Filed Apr. 17, 1989, Ser. No. 339,598

Int. Cl.[5] H01B *1/06;* C08K *63/00;* C08L *63/00*

U.S. Cl. 252—511 **12 Claims**

1. A rust-proof sealing composition comprising 30 to 90 parts by weight of an epoxy resin; 8 to 30 parts by weight of a curing agent containing a carboxylic acid derivative selected from the group consisting of aminocarboxylic acid, polycarboxylic acid hydrazide having not less than 8 carbon atoms and mixtures thereof; 1 to 20 parts by weight of an electrically conductive carbon; and a balance of a filler such that the total amounts make up 100 parts by weight, said epoxy resin con-

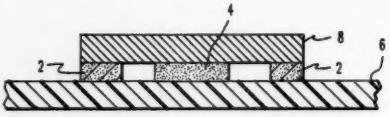
taining 100 to 30 wt. % of a modified epoxy resin selected from the group consisting of a butadiene/acrylonitrile-modified epoxy resin, an urethane-modified epoxy resin and mixtures thereof, and 0 to 70 wt. % of an epoxy other than said modified epoxy resin selected from the group consisting of bisphenol A type epoxy resin, bisphenol F type epoxy resin, bisphenol AD type epoxy resin, phenol novolak type epoxy resin, brominated epoxy resin, glycidyl ether type epoxy resin, glycidyl ester type epoxy resin, cycloaliphatic epoxy resin, glycidyl amine type epoxy resin, heterocyclic epoxy resin and mixtures thereof.

4,999,136

ULTRAVIOLET CURABLE CONDUCTIVE RESIN

Wei-Fang A. Su, Murrysville; Anthony P. Barrett, Munhall; Luciano C. Scala, Murrysville, and Karl F. Schoch, Jr., Pittsburgh, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 23, 1988, Ser. No. 235,089
Int. Cl.[5] H01B *1/06*
U.S. Cl. 252—512 **13 Claims**



1. A conductive adhesive comprising:
(A) about 5 to 20 weight percent of a blend of an acrylate epoxy and a urethane, a copolymer of an acrylate epoxy and a urethane, or mixtures thereof;
(B) about 5 to 20 weight percent of a polyfunctional acrylate monomer selected from the group consisting of:
1,3-butylene glycol diacrylate;
1,4-butandiol diacrylate;
Diethylene glycol diacrylate;
1,6-hexanediol diacrylate;
2,2-dimethylpropane-1,3-diacrylate;
tetraethylene glycol diacrylate;
tripropylene glycol diacrylate;
Trimethylpropane triacrylate;
pentaerythritol triacrtylate;
ethoxylated trimethylol propane triacrylate;
glyceryl propoxy triacrylate, and mixtures thereof;
(C) about 1 to 7 weight percent of a photoinitiator; and
(D) about 60 to 80 weight percent of a conductive filler selected from the group consisting of silver, iron, copper, nickel and mixtures thereof, and having a particle size of less than about 16 microns.

4,999,137

SEMI-CONDUCTIVE CERAMIC COMPOSITION AND ITS USE IN THE MANUFACTURE OF SPARK PLUGS

Simone Wapler, Neuilly/Seine, and Patrick Balland, Rueil Malmaison, both of France, assignors to Eyquem, Cedex, France

Filed Nov. 7, 1989, Ser. No. 432,879
Claims priority, application France, Nov. 21, 1988, 88 15117
Int. Cl.[5] C04B *35/52;* H01B *1/04*
U.S. Cl. 252—516 **7 Claims**

1. In a semi-conductive ceramic composition obtained from a basic composition containing 40 to 80% by weight of a semi-conductor which is a silicon carbide or boron carbide, 5 to 40% by weight of a binder or of a mixure of binders selected from the group consisting essentially of aluminum oxide, beryllium oxide, zirconium oxide, magnesium oxide, silica and silicon nitride, and 0 to 40% of a flux or a mixture of fluxes selected from the group consisting essentially of alkaline-earth carbonates and oxides, rare earth oxides and metal silicates, the improvement wherein 5 to 40% by weight, relative to the basic composition, of a heat-emitting dope selected from the group consisting essentially of titanium, barium titanate, tungsten and lanthanum boride is added.

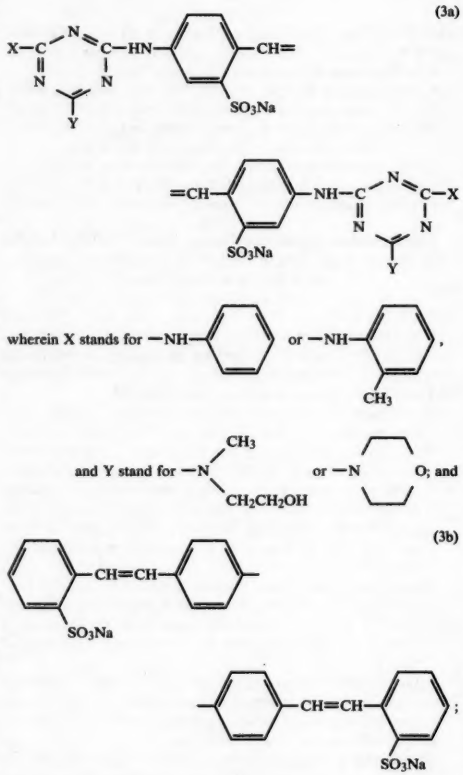
4,999,138

HIGH-DENSITY GRANULAR CONCENTRATED DETERGENT COMPOSITION

Tutomu Nebashi; Shinichi Yabe; Nobuyoshi Yamaguchi; Shuichi Takizawa, and Fumio Sai, all of Tochigi, Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Jul. 6, 1989, Ser. No. 376,006
Claims priority, application Japan, Jul. 28, 1988, 63-188961
Int. Cl.[5] C11D *3/28, 1/02;* C09B *49/02*
U.S. Cl. 252—543 **3 Claims**

1.



4,999,139

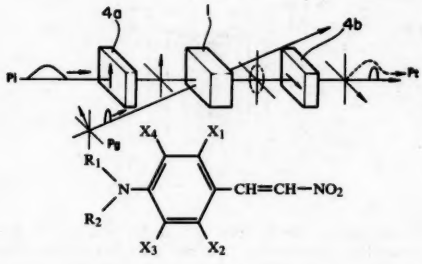
ORGANIC NONLINEAR OPTICAL MATERIAL AND NONLINEAR OPTICAL DEVICE

Takashi Kurihara, Mito; Shiro Matsumoto, Iruma; Toshikuni Kainou, Mito; Hirohisa Kanbara, Yokohama, and Kenichi Kubodera, Isehara, all of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

Filed Feb. 16, 1990, Ser. No. 481,460
Claims priority, application Japan, Jan. 27, 1988, 63-14394; Jan. 24, 1989, 1-14379
Int. Cl.[5] F21V *9/04;* G02B *5/22, 6/10*
U.S. Cl. 252—587 **13 Claims**

1. A nonlinear optical device comprising an optical medium and an optical element including a polarizer, an optical resona-

tor and a reflector, said optical medium comprising an organic nonlinear optical material represented by the formula:



wherein each of R_1 and R_2 is an alkyl group having 2 to 6 carbon atoms or a hydroxyalkyl group having 2 to 6 carbon atoms, R_1 and R_2 being same or different groups; or R_1 is an ethyl group and R_2 is a group selected from the group consisting of an acryloyloxyethyl group and a methacryloyloxyethyl group; and each of X_1, X_2, X_3, and X_4 is individually a hydrogen atom, a hydroxyl group, a halogen atom, an alkyl group, an alkoxy group, an alkyl ester group, or an alkylamide group, where X_1, X_2, X_3 and X_4 are the same or different groups.

4,999,140

DOMESTIC CARBONATOR

Albert J. Sutherland, 1 Kesteven Close, Hainault, Essex, England, and Neil K. Sutherland, 25 Parliament St., Colborne, Ontario KDKISO, Canada K0K 1S0

Filed Sep. 28, 1988, Ser. No. 250,365
Int. Cl.[5] A23L *2/00*; B01F *3/00*
U.S. Cl. 261—59 **9 Claims**

1. Apparatus for gasifying liquid in a container comprising a cap for said container having an injector passage closed by a one-way non-return valve in combination with a body having means for mounting a cylinder of pressurized gas of the type having a flow control valve for supplying a flow of gas at supply pressure, said body having reduction means for receiving the gas from said cylinder, a passageway connecting said reduction means to an outlet configured for mating engagement with said injector passage of said cap, a control valve means comprising an injector piston incorporating said outlet and moveable between a non-depressed position and depressed position and a control piston urged by said supply pressure of gas to a shut off position whereat said control piston shuts off the flow of gas through said passageway and urges said injector piston to said non-depressed position, and moveable by the movement of said injector piston to said depressed position to an open position whereat said control piston allows the flow of gas through said passageway to said outlet, and a pressure relief valve connected to said passageway at a point in continuous communication with said outlet and wherein said apparatus includes sealing means associated with said cap or said body for providing a seal between said outlet and said injector passage of said cap, wherein said reduction means and said control valve means are for controlling the flow of gas to said outlet and wherein said injector piston is for movement to said depressed position by said cap.

4,999,141

MANUFACTURING METHOD FOR PLASTIC OPTICAL FIBER

Keiji Ueno, Osaka, and Haruo Saen, Tochigi, both of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 108,441, Oct. 15, 1987, abandoned. This application Apr. 10, 1989, Ser. No. 335,409
Claims priority, application Japan, Oct. 15, 1986, 61-246268
Int. Cl.[5] B29D *11/00*
U.S. Cl. 264—1.4 **4 Claims**

1. A method of manufacturing a plastic optical fiber including (1) a core made of a setting type transparent silicone rubber and (2) a cyindrical outer portion made of a high molecular weight substance whose refractive index is at least 0.02 less than that of the core, comprising the steps of:

a) injecting the silicone rubber for the core into the cylindrical outer portion;

b) setting the injected silicone rubber at room temperature; and

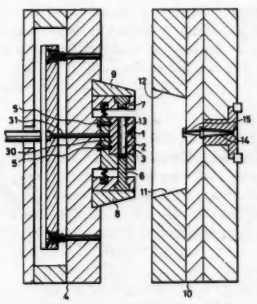
c) heating the core and the outer portion at a temperature of 120° C. or greater for at least one hour to stabilize the light receiving properties of the optical fiber.

4,999,142

METHOD OF MOLDING A LENS ARRAY

Tetsuo Fukushima, Hirakata; Toshinori Otsuki, Yawata; Shinji Okada, Neyagawa, and Kenichiro Seutsugu, Amagasaki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Jun. 6, 1989, Ser. No. 364,901
Claims priority, application Japan, Jun. 7, 1988, 63-140015
Int. Cl.[5] B29D *11/00*
U.S. Cl. 264—1.7 **4 Claims**



1. Method of molding a lens array comprising the steps of:

providing a mold having first and second mold parts;

providing a lens-holding frame having at least one array of through holes defined therethrough, each said through hole having first and second open ends, a gate being defined through a side wall of each said through hole so as to be in communication with an interior space defined by the side wall of said respective through hole;

mounting said lens-holding frame to one of said mold parts;

mounting a plurality of inner core elements to one of said mold parts, each said inner core having a mirror finished lens-forming surface defined thereon;

inserting a said inner core into each said open end of each said through hole so that a mold cavity is defined by the interior space of each said through hole and the mirror finished lens-forming surfaces of inner cores inserted into the open ends of said respective through hole;

urging said mold parts together, said mold having sprues and runners in fluid communication with each said gate of said lens forming frame;

filling said mold cavities with a transparent resin supplied through said sprues and runners of said mold and through said gates of said lens-forming frame; and

cooling said transparent resin.

4,999,143

METHODS AND APPARATUS FOR PRODUCTION OF THREE-DIMENSIONAL OBJECTS BY STEREOLITHOGRAPHY

Charles W. Hull, Arcadia, and Charles W. Lewis, Van Nuys, both of Calif., assignors to 3D Systems, Inc., Valencia, Calif.

Filed Apr. 18, 1988, Ser. No. 182,801

Int. Cl.[5] B29C *35/08*

U.S. Cl. 264—22 **46 Claims**

5. A method for producing a three-dimensional object from a medium capable of selective physical transformation upon exposure to synergistic stimulation, comprising the following steps:

forming a three-dimensional object having a first object surface spaced from a second surface by a spacing, and at least partially opposing the second surface; and

forming a removable support substantially layer by layer in said spacing from a material, said support in cross-sectional width being thin, and comprising a solid extending along a path connecting said first and second surfaces, the path having a vertical path component which is greater than any horizontal path component, and also extending substantially more than said width along at least one of said first and second surfaces.

4,999,144

PRESSURE SELF-COMBUSTION SINTERING METHOD

Yoshinari Miyamoto, Kawanishi, and Hirohiko Nakata, Itami, both of Japan, assignors to Osaka University and Sumitomo Electric Industries, Ltd., both of Osaka, Japan

Filed Oct. 27, 1988, Ser. No. 263,245

Claims priority, application Japan, Oct. 30, 1987, 62-277150

Int. Cl.[5] C04B *35/64*

U.S. Cl. 264—56 **7 Claims**

1. A method of synthesizing and sintering ceramics using heat of formation of said ceramics under pressure, which comprises

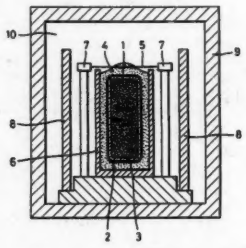
pressing and inserting a mixture of metallic and non-metallic elements comprising said ceramics inside a vessel,

vacuum sealing said vessel to render said vessel airtight,

placing another mixture comprising metallic elements and non-metallic elements which have sufficient heat of formation around the outside of said airtight vessel,

placing the resultant assembly in a pressure vessel and heating said assembly to a temperature below the starting point of combustion synthesis simultaneously or before applying pressure,

heating one and of said outside mixture to generate heat of formation caused by a chain reaction of said outside mixture to the other end thereof, and



heating said inside mixture through the airtight vessel by said heat of formation from said outside mixture to start reaction under pressure to synthesize and sinter said ceramics.

4,999,145

METHOD OF FORMING HYBRID ARC TUBES

Rodrigue G. Thibodeau, Marblehead, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed Dec. 15, 1989, Ser. No. 451,406

Int. Cl.[5] C04B *35/10*

U.S. Cl. 264—60 **12 Claims**

1. A method of forming an alumina arc tube of complex shape comprising:

loading a first mixture of alumina powder around a first portion of a mandrel;

loading a second mixture of alumina powder around a second portion of the mandrel;

loading the first mixture of alumina powder around a third portion of the mandrel, wherein the first mixture of alumina powder has a higher shrinkage rate than the second mixture of alumina powder;

applying pressure to the first and second mixtures of alumina powder to form a green body of alumina powder;

removing the mandrel from an inner surface of the green body;

prefiring the green body; and

sintering the prefired green body to form an alumina arc tube.

4,999,146

PROCESS FOR MANUFACTURE OF LOW DENSITY POLYTETROFLUOROETHYLENE INSULATED CABLE

William F. Grimes, Jr., South Salem, and John A. Dunn, Buchanan, both of N.Y., assignors to Thermax Wire Corp., Flushing, N.Y.

Filed Feb. 12, 1990, Ser. No. 478,846

Int. Cl.[5] B29C *47/02*

U.S. Cl. 264—127 **6 Claims**

1. In a method of forming an electrical conductor having a central core of conductive wire, and an insulative covering of low density sintered polytetrofluoroethylene including the steps of forcing an extrudate of unsintered polytetrofluoroethylene and extrusion aid through a die while reducing the cross section of said mixture, and forming a central opening in the extrudate which surrounds the wire upon exiting from said die; and subsequently passing said tube with the conductor therein through the serial steps of removing the extrusion aid,

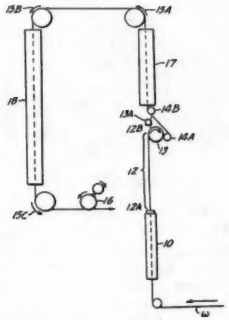
stretching said tube to obtain volumetric expansion using a driven pulley, and sintering said tube while maintaining the same in stretched condition, the improvement comprising:

(a) stretching said tube before removal of the extrusion aid to its ultimate length corresponding to the length of wire disposed therein;

(b) subsequently removing the extrusion aid while said tube is in stretched condition, and;

(c) thereafter sintering said tube while maintaining the same in stretched condition.

6. In an apparatus for extruding a hollow tube of unsintered low density polytetrofluoroethylene containing an extrusion aid from an extruder device upon an inextensible wire core in



which said tube is subsequently stretched in an longitudinal direction, the extrusion aid is removed and the tube is sintered, the improvement comprising: a driven pulley having a peripheral speed equal to the speed of the wire exiting from the extruder device, said pulley being spaced from the extruder a distance sufficient to provide a stretching zone such that said tube is in fully stretched condition at the point of engagement with said pulley, second and third idler pulleys and a synchronously driven capstan serially receiving said tube from said driven pulley; a first oven positioned between said driven pulley and said first idler pulley for removing said extrusion aid, and a second oven positioned between said second idler pulley and said driven capstan for sintering said tube.

4,999,147

METHOD FOR PRODUCING A GLAZING PRODUCT

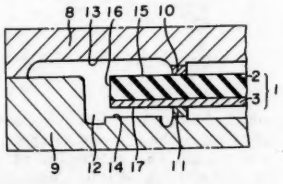
Hiroaki Kojima, Yokohama; Toshio Ichiki, Kawasaki; Shigehito Shibata, Yokohama; Takeshi Harada, Yokohama; Eiji Hirano, Yokohama, and Shoji Atsuta, Aichi, all of Japan, assignors to Asahi Glass Company, Ltd., Tokyo, Japan

Division of Ser. No. 10,645, Feb. 4, 1987, abandoned. This application Jul. 25, 1988, Ser. No. 224,240

Claims priority, application Japan, Jul. 10, 1986, 61-160726

Int. Cl.[5] B29C *45/14, 37/02*

U.S. Cl. 264—139 **4 Claims**



1. A process for producing a glazing product, which comprises:

forming a bilayer glass composed of an inorganic glass layer and a self-healing transparent elastic plastic layer bonded to one side of the inorganic glass layer, said bilayer glass having a marginal edge surface formed by the marginal edge surface of the inorganic glass layer and the marginal edge surface of said plastic layer;

applying a removable protective material to at least part of the plastic layer surface not bonded to the glass layer;

placing at least the marginal edge surface of said bilayer glass within a mold cavity thereby forming a modified mold cavity in the shape of a gasket defined by said marginal edge surfaces, the surface of the inorganic layer, the protected surface of the plastic layer and the inner surface of the mold;

injecting into the modified mold cavity a plastic material mixture which is capable of rapidly reacting and curing;

allowing the plastic material to react and cure to form a gasket; and

removing the protective material from said plastic layer after said gasket has formed.

4,999,148

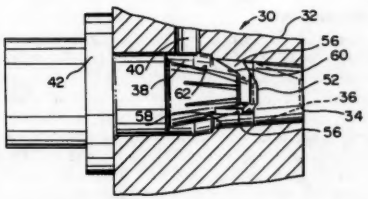
METHOD AND APPARATUS FOR MAKING REINFORCED INSULATED ELECTRICAL CONDUCTOR

Andre Dumoulin, Ville De Deux Montagnes, and Michel Gervais, Verdun, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Aug. 24, 1989, Ser. No. 397,934

Int. Cl.[5] B29C *47/02*

U.S. Cl. 264—174 **4 Claims**



1. An extrusion die assembly having:

a die housing and defining an extrusion die orifice;

core tube means for directing an elongate electrical conductor and elongate reinforcing elements along passlines extending through the die orifice with the passlines of the reinforcing elements angularly spaced apart around the passline for the length of electrical conductor; and

position control means for limiting the radial outward movement of the reinforcing elements to positions spaced within the surface of the extrusion die orifice, said position control means comprising an annulus disposed within an extrudate flow chamber of he die housing and arm spaced-apart circumferentially of the annulus and extending radially outwards from the annulus to hold the annulus in a position spaced from walls of the chamber and surrounding the passlines of the conductor and of the reinforcing elements with the annulus disposed entirely between the downstream end of the core tube means and the die orifice to define a gap extending axially downstream from the downstream end of the core tube means to an upstream end of the annulus to enable extrudate disposed downstream of the core tube means and in the axially extending gap to flow radially to either side of the annulus and to recombine into a non-interfacial single unitary mass of extrudate downstream of the annulus.

4. A method of insulating an elongate electrical conductor while providing longitudinally extending reinforcement within the insulation comprising:

passing the elongate electrical conductor and elongate tensile reinforcing elements from core tube means and through a chamber of an extrusion die containing flowing

extrudate, and directing the conductor and reinforcing elements through a die orifice as the extrudate is being extruded from the orifice to form the insulation surrounding the conductor with the tensile reinforcing elements embedded int he insulation and angularly spaced-apart around the electrical conductor; and

during passage of the reinforcing elements from the core tube means to the die orifice, passing the reinforcing elements through an annulus mounted within and spaced from walls of the chamber so as to limit radial outward movement of the reinforcing elements to positions spaced within the surface of the extrusion die orifice while extrudate disposed within the chamber and downstream of the core tube means flows into a gap extending axially downstream from the downstream end of the core tube means to an upstream end of the annulus and from the axially extending gap flows radially either to one side or the other of the annulus and recombines into a non-interfacial single unitary mass of extrudate downstream of the annulus.

4,999,149

PRODUCTION OF HIGH STRENGTH CELLULOSE FIBER USING ZINC CHLORIDE, ORGANIC SOLVENTS AND AQUEOUS SOLUTION

Li Fu Chen, West Lafayette, Ind., assignor to Purdue Research Foundation, Division of Sponsored Programs, West Lafayette, Ind.

Filed Oct. 21, 1988, Ser. No. 261,000

Int. Cl.[5] D01F *2/02*

U.S. Cl. 264—187 **23 Claims**

1. A method for producing high tensile strength, solvent-spun cellulose fiber or film which is stable in alkaline solutions, said process comprising the steps of:

(a) forming an aqueous cellulose/zinc chloride ($Zncl_2$) mixture, said mixture having a final cellulose concentration in the range of from about 5% to about 45% weight to volume (w/v), and a final $Zncl_2$ concentration in the range of from about 55% to about 80% weight to weight (w/w);

(b) stirring and heating said cellulose/$Zncl_2$ mixture at a temperature ranging from about 40° C. to about 120° C., thereby forming a cellulose/$Zncl_2$ solution;

(c) extruding said cellulose/$ZnCl_2$ solution into a coagulation medium wherein the cellulose in said cellulose/$ZnCl_2$ solution coagulates to form a fiber or film, said fiber or said film not being fully crystallized;

said coagulation medium comprising one or more alcohols or ketones;

(d) removing said fiber or said film from said coagulation medium and treating said fiber or said film to remove residual solvent and coagulation medium therefrom;

(e) applying tension to said fiber or said film sufficient to stretch said fiber or said film and orient the molecules therein;

(f) submerging said fiber or said film in a bath containing water to fully crystallize said fiber or said film;

(g) removing said fiber or said film from said bath for drying or further treatment.

4,999,150

APPARATUS AND METHOD FOR INTRODUCING REINFORCEMENT INTO A MOLD

Christopher G. Bevan, Stamford, England, assignor to C. G. Bevan Associates Limited, Corby, England

Filed Apr. 21, 1988, Ser. No. 184,423

Claims priority, application United Kingdom, Apr. 21, 1987, 8709324

Int. Cl.[5] B29C *67/14, 51/08*

U.S. Cl. 264—257 **17 Claims**

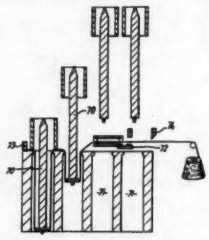
1. A method of forming a hollow-cored product comprising

(a) advancing at least one reinforcing strand material across an open top of a vertical mold by means of a reciprocating carriage having at least one strand supply means;

(b) clamping said strand at a side of said mold by a first clamping means;

(c) retracting said carriage to a position retracted from said mold on a side opposite said first clamping means whereby said strand extends across the opening of said mold;

(d) axially extending an insertion means on the strand and into said mold, said insertion means including an elongated strip removably attached at one end of said insertion



means thereby drawing said strand axially into said mold from said supply means and spacing said strands from a side wall of said mold;

(e) clamping said strand at a side of said mold by a second clamping means opposite said first clamping means and tensioning said strand;

(f) introducing a moldable material into said mold and forming a molded product;

(g) removing said insertion means from said mold; and

(h) removing said product from said mold.

4,999,151

METHOD OF QUALITY ASSURANCE IN THE MANUFACTURE OF TABLETS

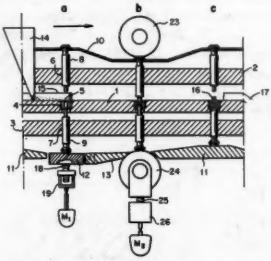
Jurgen Hinzpeter, Schwarzenbek, Fed. Rep. of Germany, assignor to Firma Wilhelm Fette GmbH, Schwarzenbek, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 88,815, Aug. 24, 1987, abandoned. This application Oct. 12, 1989, Ser. No. 420,709

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1986, 3628757

Int. Cl.[5] B29C *43/08;* B30B *11/08*

U.S. Cl. 264—40.4 **4 Claims**



1. In a method of assuring the quality of tablets manufactured in a tabletting machine having an upper and a lower tablet punch to a nominal weight comprising, sampling the actual weight of a plurality of tablets during manufacture, calculating the mean weight of the sampled tablets, comparing the mean weight of the sampled tablets to the nominal weight to determine a deviation, adjusting the tabletting machine by lowering or raising the lower tablet punch according to the

deviation in order to adjust the actual weight of the tablets to the nominal weight, the improvement comprising:

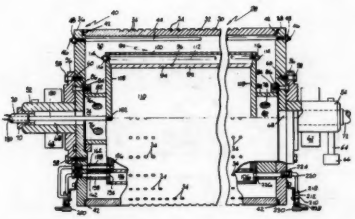
correcting the mean weight of the sampled tablets by corrective computation by means of the Shapiro-Wilks test or Nalimov test when the actual weight of one or several tablets of the sample is found to significantly deviate from the nominal weight and using the corrected mean weight as the mean weight when comparing the mean weight to the nominal weight.

4,999,152

APPARATUS AND METHOD FOR FORMING A PLASTIC SHEET

Edward P. Baldwin, Spring Lake Township, Ottawa County, Mich., and John S. Todor, Jr., Arvada, Colo., assignors to Adolph Coors Company, Golden, Colo.

Filed Jun. 16, 1989, Ser. No. 367,058
Int. Cl.[5] B29C *39/14*
U.S. Cl. 264—555 **20 Claims**



1. Apparatus for use in forming a continuous sheet of a rigid thermoplastic material having a plurality of recesses formed in one surface thereof and projections formed on the other surface thereof comprising:

a fluid tight forming drum having a generally cylindrical outer peripheral surface having a plurality of radially inward extending recesses formed therein and an inner peripheral surface;

mounting means for mounting said fluid tight forming drum for rotation about a fixed axis;

rotating means for rotating said fluid tight forming drum;

cooling means for directing a flow of cooling fluid over said inner peripheral surface for maintaining said fluid tight forming drum at a desired temperature;

feeding means for feeding successive portions of a continuous sheet of heated thermoplastic material into contact with successive portions of said outer peripheral surface of said fluid tight forming drum;

force applying means for applying a force to said successive portions of said continuous sheet to hold said successive portions in contact with said successive portions of said outer peripheral surface;

vacuum forming means connected to said recesses located in said successive portions of said outer peripheral surface to draw areas of said successive portions of said heated thermoplastic material into conformation with each of said recesses;

said vacuum forming means comprises a hollow drum located within said fluid tight forming drum and forming an annular space between said forming drum and said hollow drum for passage of said cooling fluid;

vacuum cut-off means for discontinuing said vacuum when said heated thermoplastic material has been cooled to a desired temperature so that said successive portions thereof may be removed from said fluid tight forming drum; and

removing means for removing said cooled successive portions from said fluid tight forming drum as a continuous sheet of a rigid thermoplastic material having a plurality of recesses formed in one surface thereof and a plurality of projections formed in the other surface thereof.

19. Method for forming a continuous flat sheet of a heated soft thermoplastic material into a continuous sheet of a cooled rigid thermoplastic material having a plurality of recesses formed in one surface thereof and a plurality of projections on the other surface thereof using a hollow fluid tight forming drum having a generally cylindrical outer peripheral surface having a plurality of radially inwardly extending recesses formed therein and having an inner peripheral surface and a vacuum drum mounted within said forming drum to provide an annular space therebetween between and which fluid tight forming drum is rotating about a fixed axis of rotation comprising:

feeding successive portions to a continuous sheet of a heated soft thermoplastic material into contact with the successive portions of said outer peripheral surface of said hollow fluid tight forming drum;

applying a force to said successive portions of said continuous sheet to draw said successive portions into contact with said outer peripheral surface for rotation therewith;

applying a vacuum to each of said recesses in said successive portions of said outer peripheral surface to draw areas of said successive portions of said continuous sheet radially opposite to said recesses into conformation with said recesses;

flowing cooling fluid through said annular space and in contact with said inner peripheral surface so as to maintain said hollow fluid tight forming drum at a temperature to cool said heated soft thermoplastic material;

maintaining said vacuum until said continuous sheet has cooled to a temperature at which it is self-supporting so that it may be removed from said hollow fluid tight forming drum without having any detrimental effect on the shape of the recesses formed therein;

discontinuing the application of said vacuum through said recesses; and

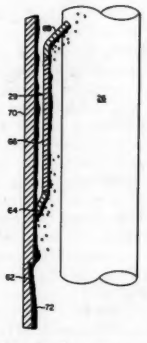
removing said cooled thermoplastic material as a continuous sheet of a rigid thermoplastic material having a plurality of recesses formed in one surface thereof and a plurality of projections formed on the other surface thereof.

4,999,153

FLOW TRIPPER IN COMBINATION WITH SPACER DEFLECTOR

Eric B. Johansson; Robert B. Elkins, both of San Jose; Russell L. Crowther, Saratoga, and Bruce Matzner, San Jose, all of Calif., assignors to General Electric Company, San Jose, Calif.

Filed Mar. 21, 1990, Ser. No. 497,803
Int. Cl.[5] G21C *3/34*
U.S. Cl. 376—443 **14 Claims**



1. In a fuel bundle for a boiling water nuclear reactor having

an upper tie-plate, a lower tie-plate, a channel extending between and surrounding said tie-plates and having an inside channel wall, a plurality of fuel rods supported at the top by said upper tie-plate and supported at the bottom by said lower tie-plate and held in upstanding side-by-side parallel vertical relation between said tie-plate within said fuel bundle by fuel rod spacers, said fuel bundles for heating water coolant introduced through said lower tie-plate into the interior of said channel and producing a two phase water steam mixture in the upper portion of said channel, and at least one spacer located in said upper portion of said fuel bundle in said two-phase water steam mixture;

the improvement in said channel and said spacer comprising:

flow trippers configured in said inside channel wall in said upper two phase region of said reactor, said flow tripper being placed immediately below the spacers and providing a groove configured into the wall of said channel having a discontinuity at the upper edge thereof for diverting water flowing along the inside channel wall away from said wall;

said spacers having a peripheral band, said band circumscribing said spacers and having a lower portion immediately overlying said trippers;

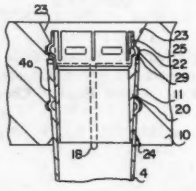
said peripheral band having an outwardly bent skirt at the lower portion of said band extending to and towards said inside channel wall immediately overlying said flow trippers whereby water flowing along said inside channel wall is diverted away from said channel wall and deflected by said flow tripper to said outwardly flared skirts for further deflection towards said fuel rods within said fuel bundle.

4,999,154

DEMOUNTABLE FUEL ASSEMBLY FOR A NUCLEAR REACTOR COOLED BY LIGHT WATER

Bernard Petit, Saint Genis Laval, France, assignor to Framatome, Courbevoie and Cogema, Velizy Villacoublay, both of, France

Filed Sep. 19, 1989, Ser. No. 409,185
Claims priority, application France, Sep. 19, 1988, 88 12213
Int. Cl.[5] G21C *3/32*
U.S. Cl. 376—446 **6 Claims**



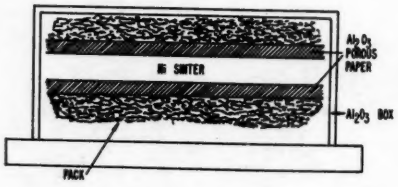
1. A demountable fuel assembly for a nuclear reactor cooled by light water comprising a bundle of parallel fuel rods held inside a framework (9) formed by guide tubes (4), struts (3) and end blocks (5, 6) fixed onto the ends of the guide tubes (4), at least one of the end blocks (5) being fixed onto one of the ends of each of the guide tubes (4) in a demountable manner, by means of an end part (4*a*) of the guide tube (4) deformable radially and having a securing part (17) projecting radially outwards, engaged inside and over a part of the length of a hole (11) passing through the end block (5) and comprising, in its part receiving the guide tube (4), an annular enlargement (16) intended to receive the securing part (17) of the guide tube (4), radial expansion of the end of the guide tube (4) and holding of its securing part (17) inside the annular enlargement (16) of the hole (11) of the end block (5) being ensured by a locking sleeve (20) comprising a bush (24) for expanding the guide tube (4) and a ferrule (25) for fixing in the end block (5) projecting at the end of the guide tube (4) in the locked position of the sleeve (20), inside the part of the hole (11) of the end block (5) not receiving the guide tube (4), which comprises at least one radial cavity (22) inside which the fixing ferrule (25) is deformed so as to ensure fixing of the locking sleeve (20), wherein the fixing ferrule (25) consists of at least two cylindrical segments (25*a*, 25*b*, 25*f*) separated from one another by at least two slits (26) arranged in the direction of the generatrices of the fixing ferrule (25) and w-herein the hole (11) passing through the end block (5) comprises at least one radial cavity (22) coinciding with at least one of the cylindrical segments (25*a*, . . . 25*f*), in the locked position of the sleeve (20).

4,999,155

METHOD FOR FORMING POROUS OXIDE DISPERSION STRENGTHENED CARBONATE FUEL CELL ANODES WITH IMPROVED ANODE CREEP RESISTANCE

Estela T. Ong; Diane S. Erickson, both of Chicago, and Leonard G. Marianowski, Mt. Prospect, all of Ill., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Oct. 17, 1989, Ser. No. 422,998
Int. Cl.[5] B22F *5/00*
U.S. Cl. 419—2 **20 Claims**



1. A method for forming porous oxide dispersion strengthened molten carbonate fuel cell anodes having improved anode creep resistance comprising:

(a) forming a porous plaque of nickel-titanium alloy having between about 1–5 weight percent titanium;

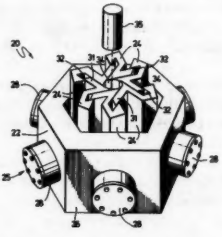
(b) internally oxidizing said titanium of step (a) without oxidizing said nickel by contacting said plaque with a gas mixture containing hydrogen and steam in a ratio of about 2 volumes steam to about 1 volume hydrogen for at least 10 hours at a temperature in the range from about 600° C. to about 900° C. to form said oxide dispersion strengthened anode.

4,999,156

BI-DIMENSIONAL COMPRESSION METHOD

Kenneth H. G. Ashbee, Knoxville, Tenn., assignor to University of Tennessee Research Corporation, Knoxville, Tenn.

Division of Ser. No. 243,691, Sep. 13, 1988, Pat. No. 4,906,434.
This application Mar. 1, 1990, Ser. No. 487,202
Int. Cl.[5] B22F *7/00*
U.S. Cl. 419—5 **4 Claims**



1. A method for making a tube of compactable material comprising the steps of:

providing an elongate core of material;

positioning an amount of compactable material about the elongate core;

applying two-dimensional compression to the compactable material to consolidate the compactable material abot the core wherein the pressure of compression is applied in at least two directions in a plane simultaneously and wherein the plane in which compression is applied is oriented generally perpendicular to the longitudinal axis of the core; and

removing the core from the consolidated amount of compactable material.

4,999,157

METHOD FOR MOLDING POWDERS

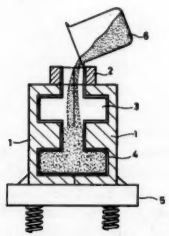
Hiroaki Nishio; Akira Kato, and Sazo Nakamura, all of Kawasaki, Japan, assignors to NKK Corporation, Tokyo, Japan

Filed Mar. 5, 1990, Ser. No. 488,701

Claims priority, application Japan, Jun. 22, 1989, 1-158339

Int. Cl.[5] B22F *1/00*

U.S. Cl. 419—68 **23 Claims**



1. A method for molding powders to form a shaped compact comprising the steps of:

forming a mold support having at least an opening and an inner surface defining a cavity;

forming a film of natural or synthetic rubber latex on an inner surface of said mold support by pouring said latex through said opening into said cavity of the mold support and discharging a substantial portion of said latex poured into the cavity;

forming a thin-wall resilient mold on said inner surface inside said cavity of mold support by drying said formed film of latex;

charging powders as materials for a compact from said opening into said thin-wall resilient mold to fill said thin-wall resilient mold;

exhausting air out of the thin-wall resilient mold filled with the powders through said opening and sealing the opening of said mold support to thereby seal the thin-wall resilient mold;

separating said thin-wall resilient mold filled with the powders from said mold support; and

subjecting said thin-wall resilient mold to a cold isostatic press treatment.

4,999,158

OXIDATION RESISTANT IRON BASE ALLOY COMPOSITIONS

John M. Corwin, Royal Oak, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Continuation of Ser. No. 938,179, Dec. 3, 1986, abandoned. This application Nov. 2, 1988, Ser. No. 267,689

Int. Cl.[5] C22C *37/10, 30/00, 37/00, 38/00*

U.S. Cl. 420—8 **49 Claims**

1. A crystalline iron-base alloy composition exhibiting improved resistance to oxidation, comprising:

(i) iron;

(ii) chromium;

(iii) silicon;

(iv) magnesium at a level of about 0.1 to about 1.5 percent, by weight of the final composition;

(v) calcium at a level of about 0.1 to about 1.5 percent, by weight of the final composition; and

(vi) an amount of a dopant element sufficient to show a significant and reproducible improvement in one or more oxidation resistant properties of the final composition selected from the group consisting of sodium, lithium, potassium and mixtures thereof.

4,999,159

HEAT-RESISTANT AUSTENITIC STAINLESS STEEL

Yoshihiro Uematsu, Kudamatsu; Isami Shimizu, Yamaguchi, and Naoto Hiramatsu, Tokuyama, all of Japan, assignors to Nisshin Steel Company, Ltd., Japan

Filed Feb. 13, 1990, Ser. No. 479,289

Int. Cl.[5] C22C *38/44*

U.S. Cl. 420—53 **13 Claims**

1. A heat-resistant austenitic stainless steel essentially consisting of:

C: not more than 0.06%,

Si: 1–4%

Mn: 0.5–4%

P: not more than 0.035%,

S: not more than 0.005%,

Ni: 10–17%

Cr: 14–20%

Mo: 1–4%

Al: 0.01–0.5%

N: not more than 0.035%

the balance being Fe and unavoidable impurities, wherein the total content of Si and Mo satisfies the formula (1) and (2) below, and the D value as defined by the formula (3) below is 7–11, said steel having excellent hot salt corrosion resistance, weldability, salt corrosion resistance of weld and hot-workability

$$(Si\ \% + Mo\ \%) \geqq 3\% \quad (1)$$

$$(2.5\ Si\ \% + Mo\ \%) \leqq 11\% \quad (2)$$

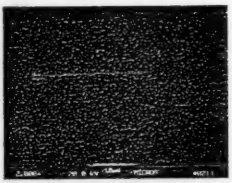
$$D = (Cr\ \% + 1.5\ Si\ \% + Mo\ \% + 3Al\ \% + 2.6\ Ti\ \% + 0.5\ Nb\ \% + 0.5\ V\ \%) - (Ni\ \% + 30\ C\ \% + 30\ N\ \% + 2\ Cu\ \% + 0.5\ Mn\ \%) \quad (3).$$

4,999,160

ALUMINUM ALLOY CONTAINING COPPER, SILICON AND TITANIUM FOR VLSI DEVICES

Tyler A. Lowrey, and Trung T. Doan, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Dec. 4, 1989, Ser. No. 445,969
Int. Cl.[5] H01L *23/48*; B32B *15/04*
U.S. Cl. 420—529 4 Claims



1. An improved aluminum alloy for VLSI integrated-circuit interconnect lines consisting essentially of copper, titanium and silicon having copper between 0.5 to 3 percent by weight, a maximum of 2 percent silicon and 1 percent titanium.

4,999,161

MODIFIED POLYMERS INCORPORATING FATTY AMINES

Claudia C. Pierce, Naperville; David A. Grattan, LaGrange Highlands, and Dodd W. Fong, Naperville, all of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Division of Ser. No. 904,434, Sep. 8, 1986, abandoned. This application Jan. 13, 1989, Ser. No. 297,272
Int. Cl.[5] C23F *11/04*
U.S. Cl. 422—12 4 Claims

1. A method for preventing condensate corrosion in boilers which comprises treating the condensate with a water-soluble or dispersible polymeric composition comprising an acrylic acid polymer having a molecular weight within the range of 500–100,000 which contains between 0.5–50 mole percent of the acrylic acid groups in the form of the amides of a water-insoluble aliphatic primary or secondary amine which contains from 10–36 carbon atoms;

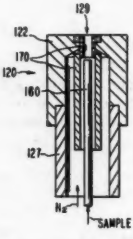
said composition hydrolyzing under the conditions found in the condensate to release a corrosion inhibiting amount of said amine.

4,999,162

HIGH TEMPERATURE FLAME JET FOR GAS CHROMATOGRAPHY

Gregory J. Wells, Suisun, and John R. Berg, Davis, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed Aug. 26, 1988, Ser. No. 237,266
Int. Cl.[5] G01N *30/68*
U.S. Cl. 422—54 19 Claims



1. A flame detector for use in a gas chromatography system, comprising:

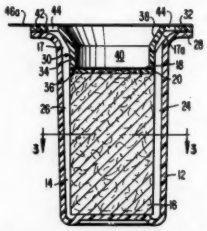
a flame jet apparatus having a hollow interior adapted for containing the sample eluting end of a chromatography column and an interior surface, the portion of the interior surface of said flame jet apparatus which is contacted by the sample eluting from the end of the chromatography column being made of a highly inert ceramic material which has been treated by contacting the interior surface with a silylating reagent at an elevated temperature.

4,999,163

DISPOSABLE, PRE-PACKAGED DEVICE FOR CONDUCTING IMMUNOASSAY PROCEDURES

Donald J. Lennon, Hopedale, and Timothy C. Murphy, Jr., Westwood, both of Mass., assignors to Hygeia Sciences, Inc., Newton, Mass.

Continuation of Ser. No. 107,240, Oct. 29, 1987, abandoned. This application Sep. 8, 1989, Ser. No. 404,061
Int. Cl.[5] G01N *21/00*, *31/22*
U.S. Cl. 422—58 18 Claims



1. A disposable, pre-packaged device for conducting an immunoassay procedure which results in the production of separable liquid and solid phases, said device comprising:

a cup means defining an elongated chamber for receiving the liquid phase from said procedure, said cup means comprising a cylindrical wall extending around said chamber, a closure wall at one end of the chamber and a liquid inlet communicating with the chamber;

a generally cylindrically shaped absorbent plug disposed entirely within the chamber for absorbing said liquid phase, said plug having a lower surface resting on said closure wall, a circumferential peripheral surface extending therearound and an upper flat surface disposed in alignment with said inlet;

a porous capture media means for capturing and displaying a solid phase separated from said liquid phase, said porous capture media means being disposed between said inlet and said flat surface and being in fluid communication with said absorbent plug via said flat surface, whereby said absorbent plug promotes flow of liquid phase through said capture media means during conduct of an immunoassay procedure; and

a spacer means in the chamber holding the peripheral surface of the absorbent plug away from the cylindrical wall to thereby present an annular breathing space communicating directly with the peripheral surface of the absorbent plug and extending essentially entirely around said peripheral surface, said cup means including a vent hole adjacent said inlet in communication with said space to facilitate venting of the absorbent plug via said peripheral surface and said space as the plug absorbs a liquid phase.

4,999,164
PIPETTING DEVICE COMPRISING A RETAINING CONE FOR HOLDING A SLIP-ON PIPETTE TIP AND PIPETTE TIP FOR SUCH PIPETTING DEVICE

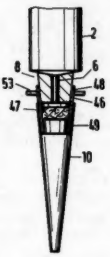
Herwig Puchinger; Hero Gerken, and Günther Kühn, all of Hamburg, Fed. Rep. of Germany, assignors to Eppendorf-Netheler-Hinz GmbH, Hamburg, Fed. Rep. of Germany

Filed Oct. 20, 1987, Ser. No. 111,440

Claims priority, application Fed. Rep. of Germany, Oct. 20, 1986, 3635598

Int. Cl.[5] B01L *3/02*

U.S. Cl. 422—100 **12 Claims**



1. A pipetting device, comprising:

a body having an upper end and a lower end and defining a cylinder chamber;

a piston guidable and reciprocable in the cylinder chamber;

means for operating the piston;

a retaining cone arranged at the lower end of and having a capillary passage extending from the cylinder chamber to an end face of the retaining cone;

a pipette tip fitted to the retaining cone and having an open pointed lower end; and

an aerosol filter detachably arranged in a region defined by the lower end of the body where the retaining cone is provided and an upper end portion of the pipette tip arranged below the retaining cone, the filter having only labyrinth-like passages and baffle surfaces, the baffle surfaces consisting of a material which adhesively reacts with substances in a fluid flowable through the filter.

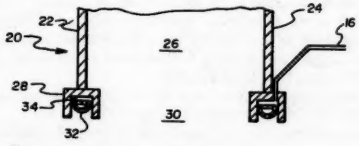
4,999,165
PRESSURE VESSEL WITH IMPROVED GASKET VALVE

Daniel Calabra, Pittsford; Charles O. Hancock, Fairport, and Brian Avant, Rochester, all of N.Y., assignors to MDT Corporation, Torrance, Calif.

Filed Oct. 27, 1989, Ser. No. 428,194

Int. Cl.[5] G05D *16/06*

U.S. Cl. 422—113 **19 Claims**



1. A pressure chamber, comprising:

a vessel configured to have an opening and an interior adapted to be pressurized;

a door positioned and arranged with respect to said vessel to operate between an open and closed position at said opening;

seal means positioned and arranged with respect to said vessel at said opening and constructed so as to be pressurized to effect an airtight seal between said door and said vessel;

switching means communicatively linked with said seal means;

a pressure supply communicatively linked with said switching means;

vent means communicatively linked with said switching means; and

pressure sensing means communicatively linked with the interior of said vessel and associated with said switching means;

wherein said switching means is configured and adapted to have a first condition in which said pressure supply is connected to said seal means and a second condition in which said seal means is connected to said vent means;

said switching means being further constructed so as to only switch from said first condition to said second condition when pressure within said vessel is within a preselected pressure tolerance.

4,999,166
FURNACE FOR FIRING WIRE-LIKE PRODUCTS

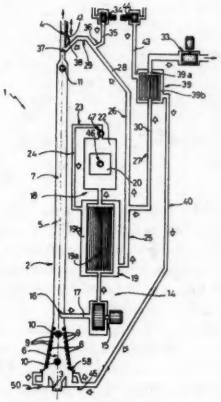
Silla F. Accati, Torino, and Hans J. Reiser, Br-Newbchland, both of Italy, assignors to Societa' Industriale Costruzioni Microelettriche, Turin, Italy

Filed Feb. 29, 1988, Ser. No. 162,155

The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.

Int. Cl.[5] F26B *13/00*

U.S. Cl. 422—131 **10 Claims**



1. A furnace for firing wire-like products, in particular copper wires clad with plastics resin, of the type comprising: a principal chamber of elongate form within which said products translate axially in a longitudinal direction between an inlet opening and an outlet opening of said principal chamber, said principal chamber further defining a first portion in which evaporation of the solvents from said plastics resins takes place and a second portion in which polymerization and cross linking of said plastics resins takes place; an auxiliary unit including an aspiration opening communicating with said principal chamber, means for drawing a first stream of air and solvent vapors from said principal chamber and an electrical resistance heater for heating said first stream to cause combustion of said vapors to form a second stream exiting from said auxilliary unit; a first fan for drawing a first airflow from an external environment a first portion of said second stream; a first aperture for introducing to said principal chamber a mixture of at least a portion of said first airflow stream with said first portion of said second stream from said auxiliary unit; and a second fan for introducing at least a of said air and solvent second portion of said second stream to a chimney; wherein said resistance

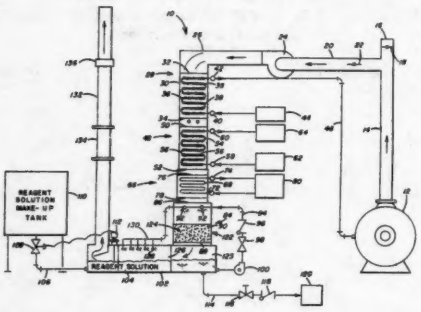
heater is constituted of a plurality of electrical resistors for heating said first stream of said air and solvent at least to a threshold temperature at which combustion of said vapors is initiated, said electrical resistors being mounted on a support structure housable in a first duct of said auxiliary unit, said support structure and at least a portion of said first duct adjacent to said support structure being made of a metal alloy resistant to high temperatures.

4,999,167

LOW TEMPERATURE NO_x/SO_x REMOVAL APPARATUS

Arthur P. Skelley, 2440 Bellwood Dr., Pittsburgh, Pa. 15237, and James C. McMichael, 1126 Harvard Rd., Monroeville, Pa. 15146

Filed Jun. 20, 1989, Ser. No. 369,249
Int. Cl.[5] C10K *1/08, 1/34*
U.S. Cl. 422—175 9 Claims



1. An apparatus for recovering heat from flue gas and removing the contaminants from the flue gas comprising,

a duct structure having an inlet for receiving exhaust gases at an elevated temperature and containing contaminants,

a plurality of heat exchangers connected in series to one another in said duct structure,

means for conveying the contaminated exhaust gases through the series connection of said heat exchangers to progressively remove heat from the exhaust gases and reduce the temperature of the exhaust gases,

a temperature controller having a coolant circulating therethrough for receiving the exhaust gases and being heated by the exhaust gases to transfer heat from the exhaust gases to the coolant and reduce the temperature of the exhaust gases from an elevated temperature to an ambient temperature,

means positioned in the duct structure for spraying the exhaust gases at ambient temperature with a finely divided stream of liquid reagent to combine the contaminants in solution with the reagent,

a chamber connected to said duct structure and including means for receiving the exhaust gases and contaminants in solution with the reagent,

an absorption enhancer contained in said chamber for receiving the contaminants in solution with the reagent and the exhaust gases to promote removal of the contaminants from the exhaust gases and entrance of the contaminants into solution with the liquid reagent, and

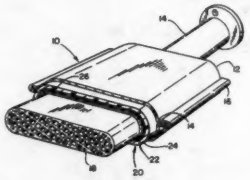
a stack connected to said chamber means for conveying from said duct structure the exhaust gases at ambient temperature and substantially free of the contaminants.

4,999,168

CRACK RESISTANT INTUMESCENT SHEET MATERIAL

John D. Ten Eyck, Lewiston, N.Y., assignor to The Carborundum Company, Cleveland, Ohio

Filed May 1, 1989, Ser. No. 345,756
Int. Cl.[5] B01D *50/00, 53/36;* F01N *3/10*
U.S. Cl. 422—179 11 Claims



1. A preformed, handleable, flexible crack resistant intumescent sheet material for use in mounting fragile structures comprising:

(A) a preformed intumescent layer, and

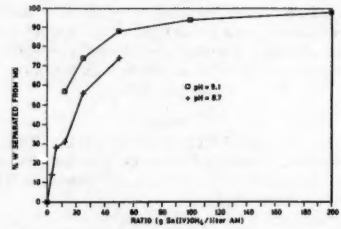
(B) a reinforcing layer selected from the group consisting of kraft paper, plastic film and inorganic fiber fabric, bonded to said intumescent layer by an adhesive which is flexible and has a bond strength greater than the shear forces from bending said material, and having a tensile strength greater than said intumescent layer.

4,999,169

METHOD FOR SEPARATING TUNGSTEN FROM MOLYBEDNUM

Michael J. Cheresnowsky, Towanda, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed Oct. 26, 1988, Ser. No. 262,633
Int. Cl.[5] C01G *39/02*
U.S. Cl. 423—54 27 Claims



1. A method of separating tungsten from molybdenum, said method comprising:

(a) adding impure acid leached molybdenum trioxide containing tungsten as an impurity to ammonium hydroxide to form an ammonium molybdate solution having a concentration of from about 150 g Mo/l to about 250 g Mo/l and from about 0.001 g W/l to about 2 g W/l and a pH of from about 8.5 to about 10;

(b) removing from said ammonium molybdate solution any insoluble residue which is present therein;

(c) contacting said ammonium molybdate solution with dry granular tin (IV) oxide hydrate in an amount sufficient so that from about 10 to about 200 g of tin (IV) oxide hydrate are present per liter of said ammonium molybdate solution, for a sufficient time to cause the sorption of essentially all of the tungsten on said tin (IV) oxide hydrate without causing the sorption of the molybdenum;

(d) separating said tin (IV) oxide hydrate with said sorped tungsten from said ammonium molybdate solution;

(e) drying said ammonium molybdate solution to obtain purified ammonium molybdate; and

(f) firing said purified ammonium molybdate to obtain purified molybdenum trioxide.

4,999,170

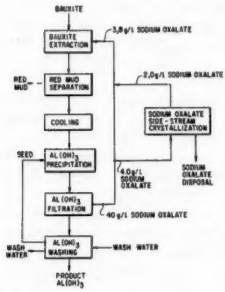
METHOD FOR REMOVING SODIUM OXALATE FROM CAUSTIC ALUMINATE LIQUORS

Neil Brown, Bonn, Fed. Rep. of Germany, assignor to Vereinigte Aluminum-Werke Aktiendesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 202,982, Jun. 3, 1988, abandoned. This application Sep. 20, 1989, Ser. No. 411,188

Int. Cl.[5] C01F *7/06*

U.S. Cl. 423—112 7 Claims



1. A process for removing sodium oxalate from a caustic aluminate liquor produced from bauxite digestion using the Bayer process, the caustic aluminate liquor including aluminum trihydroxide and sodium oxalate therein, the caustic aluminate liquor entering an aluminum trihydroxide precipitation circuit for removing the aluminum trihydroxide, leaving a spent liquor which is recycled to a bauxite digestion step, the process further including separating and removing an amount of sodium oxalate from the spent liquor, the sodium oxalate separation comprising the steps of;

a. washing all the removed aluminum trihydroxide obtained from the precipitation circuit essentially free of crystalline sodium oxalate;

b. adding a portion of the washed aluminum trihydroxide as seed in the precipitation circuit, the absence of crystalline sodium oxalate preventing crystallization of sodium oxalate within the precipitation circuit, the prevention of sodium oxalate crystallization raising the sodium oxalate concentration within the precipitation circuit to a level exceeding the solubility of sodium oxalate by at least 2 g/l;

c. taking a side-stream from the spent liquor after aluminum trihydroxide precipitation and before the bauxite digestion step;

d. adding sodium oxalate crystals as seed crystals to the side-stream, without evaporating a portion of the side-stream, thereby crystallizing sodium oxalate in an amount which is at least equal to an amount of fresh sodium oxalate produced in the Bayer process from organic substances during bauxite digestion;

e. separating the crystalline sodium oxalate, leaving an oxalate depleted liquor; and,

f. combining the depleted liquor with the spent liquor for return to the bauxite digestion step.

4,999,171

PROCESS FOR RECOVERY OF GALLIUM BY CHELATE RESIN

Yasuyuki Kato; Masaaki Matsuda, both of Osaka, and Kenji Ochi, Ehime, all of Japan, assignors to Sumitomo Chemical Co. Ltd., Osaka, Japan

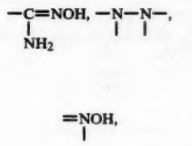
Continuation of Ser. No. 174,953, Mar. 29, 1988, abandoned. This application Aug. 2, 1989, Ser. No. 388,490

Claims priority, application Japan, Apr. 3, 1987, 62-83514

Int. Cl.[5] C22B *58/00*; C01G *15/00*

U.S. Cl. 423—112 7 Claims

1. A process for recovery of gallium by contacting an aqueous solution containing gallium and impurity metals contained in Bayer's solution or copper slag-leaching solution with a chelate resin having a higher selective adsorptivity for gallium than for impurity metals, wherein said chelate resin is selected from the group consisting of (1) chelate resins having (A) an =NOH group and (B) a functional group capable of forming a chelate bond with said functional group (A) through gallium or chelate resins having metal salts of said functional group, (2) chelate resins having oxine ligand, and (3) chelate resins having adsorptivity for gallium which contain at least one of functional groups such as $-NH_2$, —OH, =O, —SH, =S,



—NHOH, $-P(O)(OH)_2H$, until gallium is adsorbed on said chelate resin, which comprises contacting said aqueous solution with said chelate resin at a rate of at least 20 parts by volume/hr per part by volume of the chelate resin.

4,999,172

ABSORBER PACKING AND METHOD

Paul B. Simons, 5311 Mockingbird Dr. #13, Anchorage, Ak. 99507

Continuation of Ser. No. 212,884, Jun. 29, 1988, abandoned. This application Aug. 3, 1989, Ser. No. 390,469

Int. Cl.[5] C01B *17/16, 31/20*

U.S. Cl. 423—226 4 Claims

1. A method of removing hydrogen sulfide from a combustion process gas; said method comprising the steps of:

(a) providing a packed bed scrubber having packing material therein; said packing material comprising a polymeruic substance having a substantially hydrophilic outer surface;

(b) passing as process gas to be treated through said packed bed scrubber; and,

(c) passing an oxidizing reactant solution through said packed bed scrubber.

4,999,173

REMOVAL OF NITRIC OXIDES BY COPPER-CONTAINING ZEOLITES

Katsumi Kamiyama, Tokuyama, and Kazushige Igawa, Shinnanyo, both of Japan, assignors to Tosoh Corporation, Shinnanyo, Japan

Filed Oct. 7, 1988, Ser. No. 255,018

Claims priority, application Japan, Oct. 7, 1987, 62-251614; Oct. 7, 1987, 62-251615; Oct. 7, 1987, 62-251616

Int. Cl.[5] B01J *8/00*; C01B *21/00*

U.S. Cl. 423—239 2 Claims

1. A process for the catalytic decomposition of nitrogen oxides and removal of the nitrogen oxides from a gas which contains said nitrogen oxides comprising:

bringing said gas containing said nitrogen oxides into

contact with a copper-containing zeolite prepared by subjecting a zeolite having the lattice spacings (d values) indicated in the following Table as determined by powder X-ray diffraction to ion exchange with copper ions in an aqueous solution containing a water soluble copper salt and ammonia:

Lattice spacing (d value)	Relative strength	Lattice spacing (d value)	Relative strength
11.1 ± 0.3	strong	4.60 ± 0.08	weak
10.0 ± 0.3	strong	4.25 ± 0.08	weak
7.4 ± 0.2	weak	3.85 ± 0.07	very strong
7.1 ± 0.2	weak	3.71 ± 0.05	strong
6.3 ± 0.2	weak	3.04 ± 0.03	weak
6.04 ± 0.2	weak	2.99 ± 0.02	weak
5.56 ± 0.1	weak	2.94 ± 0.02	weak
5.01 ± 0.1	weak		

4,999,174

USE OF CERIUM OXIDE FOR REMOVAL OF CHLORINE FROM FUEL GASES

William G. Wilson, Pittsburgh, Pa., and D. Alan R. Kay, Burlington, Canada, assignors to Gas Desulfurization Corporation, Pittsburgh, Pa.

Filed Jun. 22, 1990, Ser. No. 542,103
Int. Cl.[5] B01D *53/34*
U.S. Cl. 423—241 **7 Claims**

1. A process for the removal of chlorine from reducing gases comprising the steps of:

(a) contacting said reducing gases containing chlorine with cerium oxide to form chlorided cerium oxide;

(b) removing said chlorided cerium oxide from said reducing gases;

(c) regenerating cerium oxide by exposing the chlorided cerium oxide to an oxidizing atmosphere to provide cerium oxide which is again capable of reacting with chlorine; and

(d) returning said regenerated cerium oxide into contact with said reducing gases.

4,999,175

PROCESS FOR SELECTIVE ADSORPTION OF SULFUR COMPOUNDS FROM GASEOUS MIXTURES CONTAINING MERCAPTANS

Etienne Vansant, Zoersel; Guido Peeters, Antwerp; Paul de Bievre, Kasterlee, and Remi van Gompel, Geel, all of Belgium, assignors to European Atomic Energy Community (EURATOM), Luxembourg, Belgium

Continuation-in-part of Ser. No. 823,994, Jan. 29, 1986, abandoned. This application May 15, 1989, Ser. No. 352,144
Claims priority, application European Pat. Off., Feb. 1, 1985, 85200128.8
Int. Cl.[5] B01J *8/00;* **C01B** *17/00, 17/16, 31/20*
U.S. Cl. 423—244 **7 Claims**

1. Process for separating other sulfur compounds from a gaseous mixture containing one or more mercaptans, and other sulfur compounds, characterized in that the gaseous mixture is treated with an impregnated solid material suitable for selective adsorption of the sulfur compounds SO_2, H_2S, CS_2, and COS; said impregnated solid material comprising a solid material selected from the group consisting of silica, alumina, clay minerals, zeolites, and mixtures thereof, as well as an active agent selected from the group consisting of monoethanolamine, diethanolamine, ethylenediamine, derivatives of these amines, and metal-containing complexes of these amines and derivatives; said solid material being impregnated with said active agent in an amount from 1 to 10 mmol of active agent per gram of solid material.

4,999,176

PREPARATION OF RARE EARTH BORIDES

Alain Iltis, Aubervilliers, and Patrick Maestro, Fosses, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Apr. 24, 1989, Ser. No. 341,809
Claims priority, application France, Apr. 22, 1988, 88 05332
Int. Cl.[5] C01B *35/02;* **C01F** *17/00*
U.S. Cl. 423—289 **30 Claims**

1. A process for the preparation of a rare earth boride selected from the group consisting of a rare earth tetraboride and a rare earth hexaboride, comprising a step of reacting a rare earth halide with elemental boron and forming a final product rare earth boride, the rare earth halide and the elemental boron being reacted during the reacting step in the presence of a reducing amount of aluminum effective to bind halide values furnished by the rare earth halide.

4,999,177

PROCESS FOR THE PREPARATION OF HIGH PURITY CARBON MONOXIDE

Shien-Chang Chen, Taiwan; Wan-Jy Cheng, Kaohsiung; Fu-Shen Lin, Kaohsiung, and Fu-Juh Huang, Kaohsiung, all of Taiwan, assignors to Dairen Chemical Corporation, Taipei, Taiwan

Filed Apr. 10, 1989, Ser. No. 335,324
Int. Cl.[5] C01B *31/18*
U.S. Cl. 423—415 A **1 Claim**

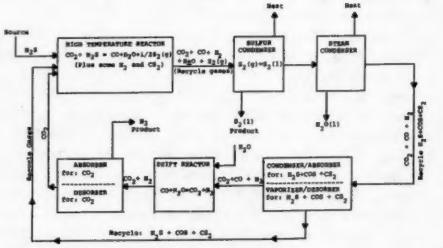
1. A process for preparing carbon monoxide of high purity in excess of 99 mole per cent by heating methyl formate under a reaction temperature of 150 to 350 degrees centigrade in the presence of a catalyst in an amount of 0.02 to 5 weight % supported on a neutral or basic carrier and a promoter of alkali or alkaline earth metal in a content of 0.1 to 10 weight %, based on a total weight of reactants charged, the improvement which comprises: said catalyst being a precious metal compound selected from platinum, iridium and ruthenium compound.

4,999,178

THERMOCHEMICAL CYCLE FOR SPLITTING HYDROGEN SULFIDE

Melvin G. Bowman, 60 White Barn Dr., Pleasant View, Utah 84404

Filed Dec. 8, 1988, Ser. No. 281,463
Int. Cl.[5] C01B *17/04, 3/06, 31/26*
U.S. Cl. 423—571 **7 Claims**



1. A method of recovery of sulfur and hydrogen from hydrogen sulfide, comprising the steps:

initially reacting carbon dioxide with a portion of the hydrogen sulfide at temperatures not lower than approximately 900° K.;

condensing the resultant gaseous sulfur to liquid sulfur;

condensing the resultant steam to liquid water;

separating the carbon dioxide+carbon monoxide+hydrogen fraction from the initial reaction leaving the sulfur bearing hydrogen sulfide+carbonyl sulfide+carbon disulfide fraction as a residual;

reacting water with the carbon monoxide of the carbon

dioxide+carbon monoxide+hydrogen fraction, resulting in hydrogen and additional carbon dioxide; and

separating the hydrogen from the carbon dioxide.

4,999,179

METHOD FOR PURIFYING IMPURE AQUEOUS HYDROGEN PEROXIDE SOLUTION

Yasuo Sugihara, Kashiwa, and Shigeki Shimokawa, Yokkaichi, both of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Dec. 7, 1989, Ser. No. 447,521

Claims priority, application Japan, Dec. 26, 1988, 63-326190

Int. Cl.[5] C01B *15/01*

U.S. Cl. 423—584 **10 Claims**

1. A method for purifying an impure aqueous hydrogen peroxide solution, which comprises passing an impure aqueous hydrogen peroxide solution through

(a) a cation exchange resin layer, a halogen-containing porous resin layer and an anion exchange resin layer in this order, or

(b) a haloge-containing porous resin layer, a cation exchange resin layer and an anion exchange resin layer in this order, or

(c) a halogen-containing porous resin layer and a mixed resin layer consisting of a cation exchange resin and an anion exchange resin in this order to contact said solution with each resin.

4,999,180

NEODYMIUM HYDROXYNITRATE

Claire Gourlaouen; Claude Magnier, both of Paris; Bertrand Latourrette, Le Raincy; Anne Tugaye, Bougival, and Francoise Deneuve, Paris, all of France, assignors to Rhone-Poulenc Specialties Chimiques, Courbevoie, France

Filed Jul. 11, 1986, Ser. No. 884,633

Claims priority, application France, Jul. 11, 1985, 85/10616

Int. Cl.[5] C01F *17/00*; C01G *1/02, 57/00*

U.S. Cl. 423—592 **26 Claims**

10 μm

1. A compound having the formula (I):

$$Nd(OH)_2NO_3 \cdot 1H_2O \qquad (I).$$

4,999,181

METHOD OF MANUFACTURING TITANIUM DIOXIDE POWDER

Mareike K. Klee, Hückelhoven/Brachelen, and Hans-Wolfgang Brand, Aachen, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 271,140, Nov. 14, 1988, abandoned. This application Apr. 2, 1990, Ser. No. 504,731

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1987, 3739854

Int. Cl.[5] C04B *35/00*

U.S. Cl. 423—608 **3 Claims**

1. A method of manufacturing amorphous titanium dioxide powder, said method comprising:

(a) adding, under an N_2 atmosphere, a 10M aqueous solution of acetic acid and an aqueous solution of ethanol to a solution of a titanium alcoholate to form a mixture of said solutions and to thereby hydrolize said titanium alcoholate,

(b) continuing said hydrolysis by allowing said mixture of said solutions to remain under the N_2 atmosphere for at the last 24 hours thereby froming a precipitate consisting of titanium dioxide particles and a liquid phase,

(c) separating said precipitate from said liquid phase,

(d) washing said separated precipitate first with deionized water and then with an aqueous ammoniacal solution having a pH of 9 and

(e) separating said precipitate from said aqueous ammoniacal solution.

4,999,182

STABILIZED ZIRCONIA POWDERS

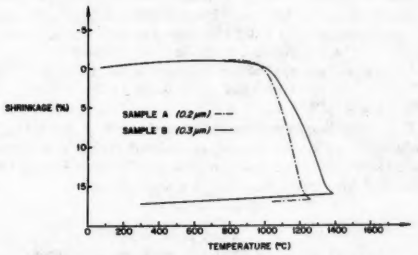
Jean-Francois Baumard, Limoges; Bertrand Dubois, Orleans, and Philippe Odier, Saint-Denis en Val, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Dec. 12, 1988, Ser. No. 282,566

Claims priority, application France, Dec. 11, 1987, 87 16549

Int. Cl.[5] C01G *25/02*; C04B *35/48*

U.S. Cl. 423—608 **23 Claims**



1. A process for the preparation of a fine stabilized zirconia powder, comprising heat treating chemically homogeneous and monodispersed aerosol droplets which comprise a mixed precursor solution of at least one inorganic zirconium salt and at least one inorganic salt of a zirconia-stabilizing element, said heat treating including (a) heating the aerosol droplets to a temperature of from 400° to 500° C. for a period of time of from 4 seconds to 2 hours, and thereafter (b) calcining such droplets at a temperature of from 650° to 1,250° C.

4,999,183

SHAVING COMPOSITIONS

Leonard Mackles, 311 E. 23rd St., New York, N.Y. 10010, and Leonard Chavkin, R.R. 1, Box 90, Bloomsbury, N.J. 08804

Filed Oct. 2, 1989, Ser. No. 415,574

Int. Cl.[5] A61K *7/00*

U.S. Cl. 424—47 **24 Claims**

1. A shaving facilitator comprising a composition of pH 5.0–10.0, compounded from:

a polyethylene oxide polymer (PEOP) of molecular weight between 0.5 and 5 million, a polysulfonic acid polymer (PSAP) of molecular weight between 100,000 and 500,000, wherein said polysulfonic acid polymer is selected from the group consisting of polyacrylamidoalkane sulfonic acids, and a topically acceptable base, wherein the ratio of PEOP to PSAP is from about 3:1 to about 1:10 and sufficient base is utilized to adjust the pH of the mixture of the polymers to within the range of 5.0–10.0.

4,999,184

ORAL COMPOSITIONS

John J. Parran, Jr., and Nabil Y. Sakkab, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 308,162, Feb. 8, 1989, Pat. No. 4,885,155, which is a division of Ser. No. 59,909, Jun. 9, 1987, Pat. No. 4,806,339, which is a division of Ser. No. 839,111, Mar. 12, 1986, Pat. No. 4,684,518, which is a continuation of Ser. No. 702,708, Feb. 19, 1985, Pat. No. 4,590,066, which is a continuation of Ser. No. 591,228, Mar. 19, 1984, Pat. No. 4,515,772, which is a continuation of Ser. No. 391,040, Jun. 22, 1982, abandoned. This application Oct. 4, 1989, Ser. No. 416,812

The portion of the term of this patent subsequent to May 7, 2002, has been disclaimed.

Int. Cl.[5] A61K *7/16, 7/18*

U.S. Cl. 424—52 6 Claims

1. An oral composition suitable for reducing calculus at the gingival margin of a person or lower animal susceptible to the formation of calculus comprising at least effective anticalculus amounts of tetrasodium pyrophosphate and tetrapotassium pyrophosphate and an effective amount of a fluoride ion source.

4,999,185

COMPOSITION FOR ORAL CAVITY

Toshio Takemori, Tokyo; Tsutomu Arakawa, Urawa; Teruo Matsumoto, Kurume, and Takashi Maruyama, Hino, all of Japan, assignors to Lotte Company Limited, Tokyo, Japan

Filed May 30, 1989, Ser. No. 358,640

Claims priority, application Japan, May 31, 1988, 63-131367

Int. Cl.[5] A61K *7/26, 9/68, 35/78*

U.S. Cl. 424—58 6 Claims

1. A chocolate composition for application to the oral cavity, containing an amount of an isolated cacao husk extract effective to inhibit sordes formation, said extract having been extracted from cacao husks with a polar solvent.

4,999,186

NOVEL SUNSCREEN AGENTS, SUNSCREEN COMPOSITIONS AND METHODS FOR PREVENTING SUNBURN

Anthony D. Sabatelli, Hamilton, Ohio, and Josephine A. Spirnak, Shelton, Conn., assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 879,725, Jun. 27, 1986, abandoned. This application Jun. 2, 1987, Ser. No. 54,046

Int. Cl.[5] A61K *3/44*

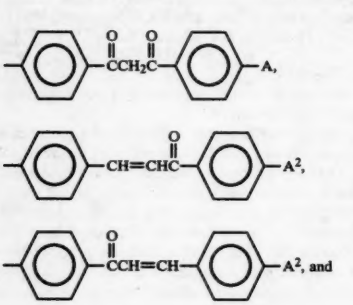
U.S. Cl. 424—60 16 Claims

1. A sunscreen compound having the structure:

X—Y—Z

wherein

(a) —X is a UVA-absorbing moiety selected from the group consisting of those having the structures:

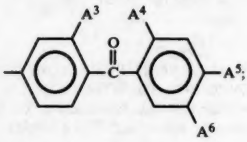


(i)

(ii)

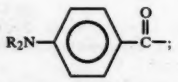
(iii)

-continued



(iv)

(b) —Z is a UVB-absorbing moiety having the structure:



(c) —Y— is a linking moiety having the structure:

$$-(W^1(CR^2_2)_n)_mW^2-;$$

wherein, in the above structures, —W^1— and —W^2— are independently selected from the group consisting of a single bond, —O— and —NR—; n is an integer from 1 to about 6; m is 1 or 2; each —R^2 is independently selected from the group consisting of —H, —OH, and straight or branched chain alkyl having from 1 to about 20 carbon atoms; —A is selected from the group consisting of —R, —OR, —NR_2 or —SO_3H, or its pharmaceutically-acceptable salt or ester; each —A^2 is independently —OR or —NR_2; —A^3 is —H or —OH; —A^4 and —A^5 are, independently, —R or —OR, and wherein further either —A^3 or —A^4 must be —OH; —A^6 is —H or —SO_3H, or its pharmaceutically-acceptable salt or ester; and each —R is independently —H, straight or branched chain alkyl having from about 1 to about 20 carbon atoms, —$(CH_2CH_2O)_pH$, or —$(CH_2CH(CH_3)O)_pH$, wherein p is an integer from 1 to about 8.

4,999,187

HAIR TREATMENT COMPOSITION AND METHOD

Della M. Vernon, 1641 N. Hillside, Wichita, Kans. 67214

Filed Jun. 5, 1989, Ser. No. 361,434

Int. Cl.[5] A61K *7/06, 7/075*

U.S. Cl. 424—70 5 Claims

1. A hair and scalp treatment composition comprising from about 60.0 wt. % to about 85.0 wt. % petrolatum; from about 5.0 wt. % to about 17.0 wt. % sulfur; from about 0.6 wt. % to about 5.0 wt. % 1,2,3-propanetriol; from 0.6 wt. % to about 5.0 wt. % mustard oil; and from about 5.0 wt. % to about 34.5 wt. % of an oil selected from the group consisting of methyl salicylate, bergamot oil, sandalwood oil, cinnamon oil, coconut oil, olive oil, mineral oil, peppermint oil, clove oil, citronella oil, and mixtures thereof.

4,999,188

METHODS FOR EMBOLIZATION OF BLOOD VESSELS

Valentin D. Solodovnik, ulitsa Novatorov, 36, Korpus 9, kv. 15; Tatyana I. Solodkaya, ulitsa Mikhalkovskaya, 20, kv. 16; Maria T. Litvinova, proezd Kadomtseva, 1, kv. 13; Taisa A. Meshkova, Yaroslavskoe shosse, 120, korpus 2, kv. 157, all of Moscow; Alexandra V. Usova, ulitsa Dzerzhinskogo, 9-A, kv. 55, Kaliningrad Moskovskoi oblasti, and Anatoly B. Davydov, ulitsa Krasny Kazanets, 19, korpus 1, kv. 283, Moscow, all of U.S.S.R.

Continuation-in-part of Ser. No. 41,646, Apr. 21, 1987, abandoned, which is a continuation of Ser. No. 593,032, Mar. 23, 1984, abandoned. This application Jun. 7, 1989, Ser. No. 362,503

Claims priority, application U.S.S.R., Jun. 30, 1983, 3613447

Int. Cl.[5] A61K *31/74, 49/04*

U.S. Cl. 424—78 2 Claims

1. A method for the embolization of blood vessels compris-

ing infusing a composition comprising, in weight percent, the following ingredients:

spherical particles of embolizing material selected from the group consisting of acetylcellulose, acetylphtalycellulose, polyvinylacetate, a copolymer of vinylpyrrolidone and methylmethacrylate, of a diameter of 0.2 to 0.3 mm, 0.01–15%;

polyalkyleneoxide of a molecular weight of 500 to 5,000, 0.01–2%; and the balance fluid medium; through a syringe and a catheter into a blood vessel.

4,999,189

SUSTAINED RELEASE ORAL SUSPENSIONS

Patricia W. Kogan, Union, N.J.; Edward M. Rudnic, Boca Raton, Fla.; Joel A. Sequeira, New York, N.Y., and Imtiaz A. Chaudry, Denville, N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Nov. 14, 1988, Ser. No. 270,311

Int. Cl.[5] A61K *31/74, 9/14, 47/00, 9/50*

U.S. Cl. 424—79 **9 Claims**

1. A sustained release oral pharmaceutical composition comprising a drug-resin complex suspended in a liquid carrier, wherein the drug-resin complex comprises a drug-resin particle coated with a first inner coating of a high temperature melting water-insoluble pharmaceutically acceptable wax and a second outer coating of a pharmaceutically acceptable water-insoluble polymer, wherein said drug-resin particle comprises an acidic or basic drug ionically bond to a pharmaceutically acceptable ion exchange resin particle.

4,999,190

PREPARATION OF I_5- POLYIODIDE DISINFECTANT RESINS

Louis R. Fina; Jack L. Lambert, and Ronald L. Bridges, all of Manhattan, Kans., assignors to Kansas State University Research Foundation, Manhattan, Kans.

Filed Jun. 13, 1989, Ser. No. 365,556

Int. Cl.[5] A61L *2/16*

U.S. Cl. 424—79 **9 Claims**

1. The method of directly preparing a polyiodide quaternary ammonium anion exchange resin disinfectant capable of killing Giardia, said resin disinfectant containing I_5^- exchange sites and I_3^- exchange sites and said resin disinfectant being prepared from an aqueous solution of an iodide (I^-) salt and elemental iodine (I_2), comprising:

(a) preparing salt aqueous solution by dissolving the iodide salt therein to an I^- concentration of 8 to 10 molal at a temperature in the range from 30° to 60° C;

(b) adding iodine (I_2) to said solution to obtain a combined concentration of I_5^- and I_3^- ions of about 8 to 10 molal, at least 50% of said ions being I_5^- ions;

(c) contacting granules of a strong base anion exchange resin in the chloride (Cl^-) form with the solution formed in steps (a) and (b) at a temperature in the range from 30° to 60° C., said resin being reactable with I_5^- and I_3^- ions;

(d) continuing said contacting until at least a total of 70% of the anion exchange sites of the resin have exchanged Cl^- for I_5^- and I_3^-, the exchange being in the I_5^- and I_3^- proportions of said solution and continuing the exchange until 50 percent of the exchange sites are I_5^- exchange sites; and

(e) washing said resin with an aqueous wash to remove the exchanged Cl^- ions therefrom.

4,999,191

***PASTEURELLA MULTOCIDA* VACCINE**

John R. Glisson, Athens, Ga., and Charles L. Hofacre, Monroe, N.C., assignors to University of Georgia Research Foundation, Inc., Athens, Ga.

Filed May 5, 1988, Ser. No. 190,533

Int. Cl.[5] A61K *39/02;* **C12N** *15/00*

U.S. Cl. 424—92 **10 Claims**

1. A vaccine for poultry against *Pasteurella multocida* comprising a mutated strain of *Pasteurella multocida*, PM#1, deposited with the American Type Culture Collection, Rockville, Md. on Apr. 19, 1988 and designated ATCC 53766, derived from the Clemson University strain and effective against serotype 3 *Pasteurella multocida.*

4,999,192

NOVEL COLEOPTERAN-ACTIVE *BACILLUS THURINGIENSIS ISOLATE*

Jewel Payne, and George G. Soares, both of San Diego, Calif., assignors to Mycogen Corporation, San Diego, Calif.

Filed Feb. 12, 1988, Ser. No. 155,189

Int. Cl.[5] C12N *1/20;* **A01N** *63/00*

U.S. Cl. 424—93 **12 Claims**

1. A process for controlling coleopteran insect pests with a δ-endotoxin which comprises contacting said insect pests with an insect-controlling effective amount of *B. thuringiensis* PS40D1 having the identifying characteristics of NRRL B-18300, or mutants thereof.

4,999,193

FEED ADDITIVE FOR ANIMALS, FEEDS CONTAINING SUCH AN ADDITIVE AND METHOD FOR IMPROVING THE GROWTH OF ANIMALS

Tan H. Nguyen, Saint-Avé, France, assignor to Etablissements Guyomarc'h S.A., Paris, France

Filed Jun. 8, 1988, Ser. No. 204,117

Claims priority, application France, Jun. 16, 1987, 8708381

Int. Cl.[5] A61K *37/00, 35/78*

U.S. Cl. 424—93 **5 Claims**

1. A method for improving the growth of animals requiring no medication which comprises causing said animals to ingest an animal feed or drink containing about 100,000 to about 5,000,000 revivable germs of *Bacillus cereus,* IP 5832 strain, per gram of said feed or drink.

4,999,194

TWO-CHAIN UROKINASE PLASMINOGEN ACTIVATORS FOR TREATMENT OF THROMBOTIC DISEASE

Robert J. Broeze, Framingham, and Gerald F. Vovis, Marlborough, both of Mass., assignors to Collaborative Research, Inc., Bedford, Mass.

Filed Jan. 14, 1988, Ser. No. 143,975

Int. Cl.[5] C12N *9/72;* **A61K** *37/547*

U.S. Cl. 424—94.63 **7 Claims**

1. A composition comprising a therapeutically effective concentration of a fibrin specific two-chain urokinase type plasminogen activator, said activator being derived by proteolysis at the arginine 156-phenylalanine 157 peptide bond of scu-PA, in admixture with a pharmacologically acceptable excipient.

4,999,195

PERSONAL CARE PRODUCTS CONTAINING BIOEMULSIFIERS

Michael E. Hayes, Fernandina Beach, Fla., assignor to Emulsan Biotechnologies Inc., New York, N.Y.

Division of Ser. No. 852,272, Apr. 15, 1986, Pat. No. 4,870,010, which is a continuation-in-part of Ser. No. 662,931, Oct. 16, 1984, abandoned. This application Jul. 5, 1989, Ser. No. 375,436

Int. Cl.[5] A61K *7/06, 7/48, 7/50, 31/71*

U.S. Cl. 424—114 **12 Claims**

1. In a moisturizing cream or lotion for topical application to skin or scalp, the improvement which comprises incorporation in such moisturizing cream or lotion at least about 0.02% by weight of a bioemulsifier produced by an *Acinetobacter calcoaceticus* species, which bioemulsifier is characterized by (a) a specific emulsification Activity of at least about 25 units per

milligram; (b) the ability to remove sebum; and (c) the ability to interfere with microbial adhesion on skin or hair.

4,999,196

COMPOUND DC-107 PRODUCED BY STREPTOMYCES SP.

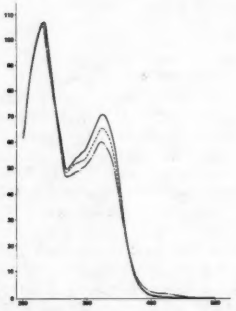
Hirofumi Nakano; Mitsunobu Hara; Isami Takahashi, all of Machida; Kozo Asano, Tsukuba; Takao Iida, Tama, and Makoto Morimoto, Shizuoka, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 218,923, Jul. 14, 1988, abandoned. This application Mar. 29, 1989, Ser. No. 330,990

Claims priority, application Japan, Jul. 22, 1987, 62-182867; Feb. 19, 1988, 63-36525

Int. Cl.[5] A61K *31/12*; C12P *7/22, 7/26, 1/04*

U.S. Cl. 424—116 5 Claims



1. A compound DC-107 having the following physicochemical properties:

(1) molecular formula: $C_{22}H_{26}N_2O_6S_3$

(2) molecular weight: 510

found by high resolution FAB mass spectrum: 511.1041

calculated for $C_{22}H_{27}N_2O_6S_3$: 511.1031

(3) melting point: 160° C. (decomposed)

(4) specific rotation: $[\alpha]^{25}_D = 140°$ (c=0.1, methanol)

(5) ultraviolet absorption spectrum: as shown in FIG. 1

(6) infrared absorption spectrum: as shown in FIG. 2

(7) solubility:

soluble in methanol, ethyl acetate, chloroform and acetone,

insoluble in water and n-hexane

(8) color reaction:

positive in reactions with ninhydrin, p-anisidine and Ehrlich's reagent

(9) a white, neutral substance

(10) ^{1}H-NMR spectrum (400 MHz, in DMSO-d_6, internal standard TMS): as shown in FIG. 3

(11) ^{13}C-NMR spectrum (100 MHz, in DMSO-d_6, internal standard TMS): as shown in FIG. 4.

4,999,197

COMPOSITIONS DERIVED FROM CAROB POD PROCESS FOR PREPARING

Pierre Würsch, La Tour-de-Peilz, Switzerland, assignor to Nestec S.A., Vevey, Switzerland

Filed Aug. 4, 1986, Ser. No. 892,939

Claims priority, application European Pat. Off., Aug. 30, 1985, 85110944.7

Int. Cl.[5] A61K *35/78*

U.S. Cl. 424—195.1 3 Claims

1. A process for preparing a carob derived composition comprising grinding ripe carob pods in a cold water medium for extracting sugars and water-soluble tannins from the pods into the water medium to obtain a ratio of water-soluble tannins to water-insoluble tannins in a residue of the pods below 0.37, as determined in water at 37° C., separating the residue of the extracted pods from the water medium, forming an aqueous dispersion of the residue, pasteurizing the residue dispersion at 95° C. to 98° C. for from 30 secs to 10 mins, grinding the pasteurized dispersion at a temperature not exceeding about 90° C., spray-drying the ground pasteurized dispersion at a temperature not exceeding 100° C. and grinding the dried residue for obtaining particles having a size of up to 200 μm in diameter.

4,999,198

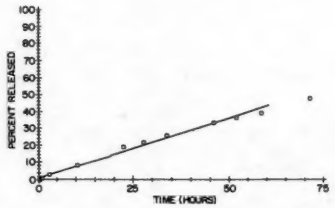
POLYAPHRONS AS A DRUG DELIVERY SYSTEM

Stanley M. Barnett; Joan M. Lausier, both of Wakefield, and Samuel J. Montalto, Westerly, all of R.I., assignors to The Board of Governors for Higher Education, State of Rhode Island and Providence Plantations, Providence, R.I.

Continuation of Ser. No. 328,801, Mar. 23, 1989, abandoned, which is a continuation of Ser. No. 939,548, Dec. 9, 1986, abandoned, which is a continuation of Ser. No. 603,455, Apr. 24, 1984, abandoned. This application Apr. 17, 1990, Ser. No. 512,043

Int. Cl.[5] A61K *9/58, 9/22*

U.S. Cl. 424—449 15 Claims



1. A method for transferring a substance into a medium which includes:

partitioning a polyaphron against the medium to define an interface, the polyaphron having at least one fluid continuous phase and a liquid disperse phase immiscible with the continuous phase, the polyaphron in fluid transfer relationship with the medium, the disperse phase carrying the substance therein and moving through the continuous phase in the direction of the medium and proceeding until coming into contact with the medium at the interface; and

engaging subsequently in substance transfer relationship with the medium whereby the substance is then transferred into the medium from the disperse phase, the disperse phase being substantially in the form of droplets having a mean diameter size between 1μm–1 mm.

4,999,199

PHARMACEUTICAL FORMULATIONS: LIPOSOMES INCORPORATING AROMATIC POLYENE ANTIBIOTICS

Elias J. Anaissie; Georgios Samonis, both of Houston, Tex.; Hans Krause, Worms-Horchheim, Fed. Rep. of Germany, and Gerald P. Bodey, Houston, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed Nov. 10, 1988, Ser. No. 269,638

Int. Cl.[5] A61K *37/22*

U.S. Cl. 424—450 35 Claims

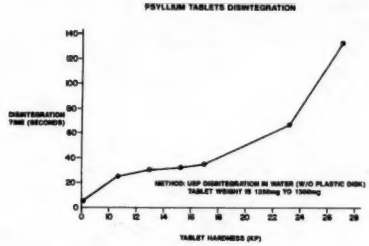
1. A pharmaceutical formulation comprising a liposome having a therapeutically effective concentration of polyene macrolide antibiotic having an attached p-aminoacetophenone or N-methyl-p-aminoacetophenone substituent.

4,999,200

PSYLLIUM TABLET COMPOSITION, METHOD OF MANUFACTURE AND METHOD OF USE

Angel Casillan, Overland Park, Kans., assignor to Marion Laboratories, Kansas City, Mich.

Filed Dec. 9, 1987, Ser. No. 130,021
Int. Cl.[5] A61K *9/36, 9/20, 35/78*
U.S. Cl. 424—480 10 Claims



1. A bulk laxative composition in tablet form consisting essentially of:

50 parts of psyllium powder ±10;

1.5 parts of a wetting agent ±1.0;

100 parts of a binding agent ±10; and

2.5 parts of a disintegrating agent ±0.5, to provide a tablet which resists fracture in commercial production but disintegrates easily in water or stomach acid.

4,999,201

METHOD FOR CONTROLLING COCKROACHES

Kiku Okamoto, Toyoake, and Shigeo Oki, 404 Negishi-haitsu, No. 1, 20-4 Negishi 5-chome, Urawa-shi, both of Japan, assignors to Shigeo Oki, Urawa, Japan

Continuation-in-part of Ser. No. 364,507, Jun. 9, 1989, abandoned, which is a continuation of Ser. No. 203,599, Jun. 6, 1988, abandoned, which is a continuation of Ser. No. 896,144, Aug. 13, 1986, abandoned. This application Oct. 18, 1989, Ser. No. 423,031
Claims priority, application Japan, Mar. 14, 1986, 61-57963
Int. Cl.[5] A01N *39/00*
U.S. Cl. 424—613 7 Claims

1. A method for controlling cockroaches, which comprises substantially airtightly forming a closed space where cockroach feces lie scattered, introducing ozone into the closed space to expose the cockroach feces present in the closed space to ozone at a concentration of 0.5 ppm to 20 ppm, continuing the exposure to ozone for a period of time of about several ten minutes up to about 8 hours so as to cause the cockroaches present in the closed space during treatment to die and to denature an aggregation pheromone contained in the cockroach feces so as to form a roach-repellent substance.

4,999,202

COMPOSITION HAVING BACTERIOCIDAL OR BACTERIOSTATIC ACITIVITY

Izak J. Cronje, Verwoerdburg; Thomas E. Cloete, and Johannes Dekker, both of Pretoria, all of South Africa, assignors to National Energy Council, Pretoria, South Africa

Filed Feb. 10, 1989, Ser. No. 308,674
Claims priority, application South Africa, Feb. 11, 1988, 88/0965
Int. Cl.[5] A01N *59/06*
U.S. Cl. 424—683 9 Claims

1. A composition having bacteriocidal or bacteriostatic activity comprising an agent selected from oxidized coal derived humic acid, and salts thereof, and a suitable carrier, wherein the oxidized coal derived humic acid contains at least the following elements:

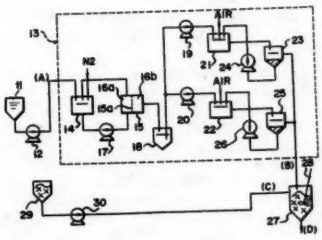
Element	Range (percent)
Carbon	45–70
Oxygen	20–40
Hydrogen	2–6

4,999,203

METHOD FOR PRODUCING MISO

Shigeki Fukuyasu; Makoto Nakamura, both of Toyokawa; Kyozo Kawachi, Tokyo; Seiji Yamaguchi, Sagamihara; Sakan Kinoshita, Yokohama, and Tadashi Numata, Kamakura, all of Japan, assignors to Ichibiki Co., Ltd., Nagoya; Kabushiki Kaisha Toshiba, Kawasaki and Shibaura Engineering Works Co., Ltd., Tokyo, all of, Japan

Division of Ser. No. 102,858, Sep. 30, 1987, Pat. No. 4,870,022.
This application Apr. 21, 1989, Ser. No. 341,545
Claims priority, application Japan, Oct. 2, 1986, 61-233348
Int. Cl.[5] A23L *1/20*
U.S. Cl. 426—46 28 Claims



28. A method of producing miso, comprising the steps of:

preparing a raw solution containing glucose, tamari-shoyu and salt;

fermenting the raw solution initially in the presence of lactic acid bacteria thereby producing a lactic fermentation solution;

fermenting a portion of the lactic fermentation solution in a main fermentation zone with yeast which converts glucose remaining in the lactic fermentation solution to ethanol and fermenting the remaining portion of the lactic fermentation solution in an afterripening zone with yeast which results in production of flavor components in the lactic fermentation solution;

combining the solution from the main fermentation zone and the afterripening zone thereby forming a flavored solution;

preparing a digested material of steam boiled soybeans, koji of rice and salt, which material constitutes the major raw material of the miso product; and

mixing the flavored solution with the digested material thereby producing miso.

4,999,204

HELICALLY SHAPED MEAT PRODUCT

Royce G. Gibson, South Wales, Australia, assignor to Tendapak Technologies PTY Ltd., Redfern, Australia

PCT No. PCT/AU87/00413, § 371 Date Jul. 24, 1989, § 102(e) Date Jul. 24, 1989, PCT Pub. No. WO88/04142, PCT Pub. Date Jun. 16, 1988
PCT Filed Dec. 4, 1987, Ser. No. 393,919
Claims priority, application Australia, Dec. 5, 1986, PH 9357
Int. Cl.[5] A23L *1/311*
U.S. Cl. 426—104 6 Claims

1. A reconstituted meat product comprising a plurality of meat pieces agglomerated together, wherein the meat pieces are elongate in form and arranged in a substantially helical array through the meat product.

4,999,205

CURCUMIN COMPLEXED ON WATER-DISPERSIBLE SUBSTRATES

Paul H. Todd, Jr., Kalamazoo, Mich., assignor to Kalamazoo Holdings, Inc., Kalamazoo, Mich.

Filed Aug. 17, 1989, Ser. No. 395,447
Int. Cl.[5] A23L *1/27*
U.S. Cl. 426—250 30 Claims

1. A process for preparing a complex of curcumin and a substrate selected from the group consisting of a water-soluble branched chain or cyclic polysaccharide and a water-soluble or water-dispersible protein and combinations thereof which comprises contacting the substrate and curcumin in an aqueous solution at a pH above about 9, at which pH the curcumin is present in its water-soluble red alkaline form, and then acidifying to drop the pH to below about 8, thereby complexing the curcumin in its neutral yellow form with the substrate.

4,999,206

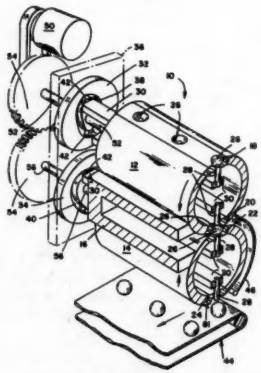
METHOD FOR FORMING THREE DIMENSIONAL FOOD PRODUCTS

James L. Lortz, Modesto, Calif., assignor to Food Forming Corporation, Reno, Nev.

Division of Ser. No. 117,659, Nov. 6, 1987, Pat. No. 4,886,441. This application Dec. 7, 1989, Ser. No. 447,203
Int. Cl.[5] A23P *1/00*
U.S. Cl. 426—512 3 Claims

1. A method for producing three dimensional molded food products from formable input food materials supplied under pressure to a sanitizable product forming machine employing a pair of parallel, rotatable, cylinder-like forming barrels, one of said barrels being positioned above the other to establish an upper and lower barrel with the outer surface of said barrels in tangential contact at a food forming position and said formable input food materials being supplied under pressure to said barrels adjacent to said tangential contact at said food forming position, said barrels being respectively rotatable about parallel axes substantially fixed with respect to each other in a manner to establish tangential mating alignment between the external cylinder-like surfaces of said barrels, the outer surface of at least one of said forming barrels having an inwardly cut-out portion to create at least one cavity, a movable means within said cavity, said movable means being movable radially with respect to the axis of rotation of said barrel, and a means for moving said movable means in said radial movement, said means for moving being positioned within said barrel in radial alignment with said cavity, a food material input chamber aligned with said outer surface of said forming barrels adjacent to said position of tangential contact of said barrels, said input chamber being positioned with respect to said position of tangential contact for input of food materials into said cavity in said forming barrel under pressure as said barrels are rotated about their axes, the steps comprising:

(a) rotating said forming barrels,



(b) feeding said food material under pressure into said food input chamber and into said cavity within said one of said barrels as said barrels are rotated,

(c) continuously rotating said forming barrels to produce said three dimensional molded food products from said input food material forced into said cavity as said barrels are rotated,

(d) moving said movable means in said cavity to force said molded food material from said cavity in said one of said barrels as a complete unit after said position of tangential contact has been passed,

(e) and controlling said radial movement of said movable means in accord with the rotational position of said forming barrels.

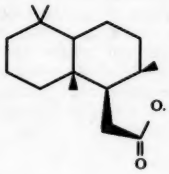
4,999,207

USE OF SCLAREOLIDE IN AUGMENTING OR ENHANCING THE ORGANOLEPTIC PROPERTIES OF FOODSTUFFS

Lawrence Buckholz, Jr., Middletown; Mohamad I. Farbood, Holmdel, both of N.J.; Nicolas Kossiakoff, Chambourcy, France, and Lewis G. Scharpf, Fair Haven, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation of Ser. No. 418,171, Sep. 29, 1989, Pat. No. 4,917,913. This application Jan. 2, 1990, Ser. No. 474,410
Int. Cl.[5] A23L *1/22, 1/236*
U.S. Cl. 426—536 1 Claim

1. A method for improving the bitter aftertaste of a foodstuff sweetened with a quantity of aspartame which gives rise to a bitter aftertaste in said foodstuff, comprising the step of adding to said foodstuff a debittering quantity of sclareolide having the structure:



4,999,208

EXTRUSION BAKING OF COOKIES HAVING LIPOSOME ENCAPSULATED INGREDIENTS

Bernhard V. Lengerich, Ringwood; Lynn C. Haynes; Harry Levine, both of Morris Plains; Michael S. Otterburn, Randolph; Paul Mathewson, and John Finley, both of Whippany, all of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed Jun. 7, 1989, Ser. No. 362,741
Int. Cl.[5] A21D *8/00, 13/00*
U.S. Cl. 426—549 **27 Claims**

1. A method for the production of a cookie product having a liposome-encapsulated component uniformly dispersed therein comprising:

(a) forming a heat treated mass in a cooker extruder by heating ingredients comprising at least one flour and shortening or fat to a temperature of at least about 150° F. to promote browning and flavor development,

(b) admixing water and at least one liposome-encapsulated component with the heat-treated mass with sufficient mixing to uniformly disperse the liposome-encapsulated component within the mass without rupturing a substantial portion of the liposomes in said cooker extruder to form a dough-like mixture, wherein the temperature of the heat treated mass is reduced to below about 140° F. for admixing with the liposome component and wherein the amount of shortening or fat is at least about 12% by weight, based upon the weight of the dough-like mixture,

(c) extruding the mixture under sufficiently low pressure and temperature such that substantial rupture of the liposomes is inhibited,

(d) forming the mixture into pieces having at least one liposome-encapsulated composition uniformly dispersed therein, and

(e) leavening the pieces by subjecting it to post extrusion heating to obtain a crumb-like structure.

4,999,209

LOW AND NON-ALCOHOLIC BEVERAGES PRODUCED BY SIMULTANEOUS DOUBLE REVERSE OSMOSIS

Barry R. Gnekow, Los Gatos, Calif., assignor to Ariel Vineyards, Inc., Napa, Calif.

Division of Ser. No. 86,256, Aug. 7, 1987, Pat. No. 4,888,189. This application Jul. 20, 1989, Ser. No. 383,159
Int. Cl.[5] C12G *1/00*
U.S. Cl. 426—592 **13 Claims**

1. A reduced alcohol fermented wine beverage having substantially the original volume produced by a method comprising the steps of:

(a) withdrawing from a holding tank over a period of time an initial volume of fermented alcoholic wine beverage and subjecting said withdrawn beverage to a first reverse osmosis to produce beverage retentate and beverage permeate fractions;

(b) returning at least a portion of said beverage retentate fraction to said holding tank to mix with remaining beverage in said tank to produce an in-process beverage fraction in said holding tank;

(c) volumetrically monitoring the beverage permeate fraction removed;

(d) subjecting water to a second reverse osmosis to produce a purified permeate water fraction and a retentate water fraction;

(e) continuously adding said permeate water from said second reverse osmosis to said beverage in-process fraction in said holding tank in an amount substantially equal to said beverage permeate fraction, less an amount corresponding to beverage retentate not returned to said in-process beverage fraction, to maintain the volume of the remaining in-process beverage fraction in said tank substantially equal to said initial volume;

(f) subjecting said in-process beverage fraction to repeated passes through said first reverse osmosis step (a) and recycle step (b) while maintaining said first and second reverse osmosis for a period sufficient to reduce said alcohol content of said in-process beverage fraction to a desired level;

(g) monitoring the alcohol content of said in-process beverage fraction in said tank; and

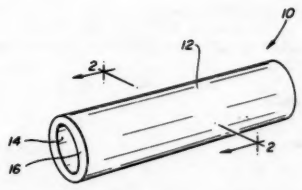
(h) withdrawing as a primary product wine beverage a low alcohol wine from said tank when said in-process beverage in said tank has had its alcohol content reduced to the desired reduced alcohol level.

4,999,210

ANTI-INFECTIVE AND ANTITHROMBOGENIC MEDICAL ARTICLES AND METHOD FOR THEIR PREPARATION

Donald D. Solomon, Spring Valley, and M. Parke Byron, Centerville, both of Ohio, assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Continuation-in-part of Ser. No. 317,418, Mar. 1, 1989, abandoned, which is a continuation-in-part of Ser. No. 298,392, Jan. 18, 1989, abandoned. This application Dec. 7, 1989, Ser. No. 449,382
Int. Cl.[5] A01N *1/02;* **A61L** *29/00;* **A61M** *25/00;* **A61K** *31/74*
U.S. Cl. 427—2 **9 Claims**



1. A method for preparing a medical article comprising:

a. extruding a first polymer having a water absorption of at least 0.6% by weight to obtain a shaped first polymer.

b. applying a laminated layer comprising a second polymer having a water absorption of at least 0.6% by weight and an antiinfective agent selected from the group consisting of a biguanide and silver sulfadiazine bulk distributed therein onto a surface of said shaped first polymer.

4,999,211

APPARATUS AND METHOD FOR MAKING A PHOTOCATHODE

Daniel D. Duggan, Roanoke, Va., assignor to ITT Corporation, New York, N.Y.

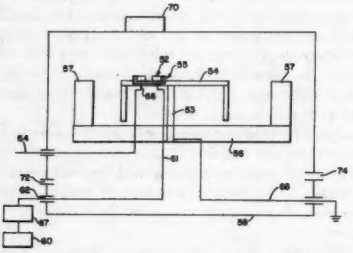
Filed Sep. 22, 1989, Ser. No. 411,079
Int. Cl.[5] H01L *31/18*
U.S. Cl. 427—8 **13 Claims**

9. A method of forming an activation layer on a photocathode comprising the steps of:

making a holder having at least two electrically conductive

sections, each of the sections being electrically isolated from each other;

placing the photocathode on the holder such that the electrically conductive sections of the holder are in contact with portions of a metallic section of the photocathode; and



directing an electric current to two electrically conductive sections in order to determine whether the electrically conductive sections of the holder are in contact with portions of a metallic section of the photocathode.

passing the substrate over a perforated cylinder, applying said heated flowable substance to said substrate from a coating head mounted in said cylinder so as to coat same as said substrate passes over said perforated cylinder whereby said substrate maintains contact with said cylinder over a certain distance, lifting off said coated substrate from said cylinder, sensing the adhesion of said substrate to said cylinder and controlling the heating of said substance in response to the sensed adhesion.

4,999,212

PROCESS AND APPARATUS FOR APPLYING A FLOWABLE SUBSTANCE TO A SUBSTRATE

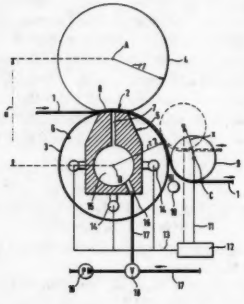
Volker Ludwig, Untere Muhlewiesen 10, D-7896 Wutoschingen-Degernau, Fed. Rep. of Germany

Filed Jul. 28, 1989, Ser. No. 386,900

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1988, 3826395

Int. Cl.[5] B05D *1/26*

U.S. Cl. 427—8 **11 Claims**



1. A process for applying a flowable substance to a substrate comprising heating said substance so that the substance flows,

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4,999,213

MONOFUNCTIONAL ALCOHOLS TO PREVENT GELATION IN TWO COMPONENT ISOCYANATE COATINGS

Walter C. Meyer, Rochester Hills, Mich., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 21, 1990, Ser. No. 482,751

Int. Cl.[5] B05D *1/04, 1/06, 1/34, 1/36*

U.S. Cl. 427—27 **13 Claims**

1. In a process for applying a two component polyurethane coating composition to a substrate by mixing a stream of a polyol having reactive hydroxyl groups with a stream of an organic polyisocyanate crosslinking agent to form a blend that is applied to the substrate, the improvement used therewith comprises

adding to the stream of polyol before application a monohydric primary or secondary alcohol in a ratio of about 0.5–2.0 equivalents of alcohol hydroxyl to polyol hydroxyl before mixing with the stream of organic polyisocyanate and before application to the substrate to prevent or substantially reduce the formation of gel particles;

wherein the monohydric primary or secondary alcohol has a 90% evaporation rate at 25° C. of less than 10,000 seconds as determined by ASTM D3539 using an Automatic Shell Thin Film Evaporator.

4,999,214

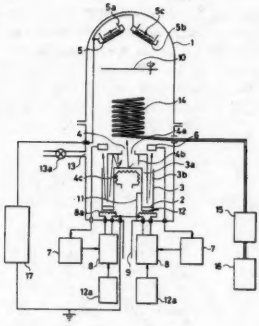
Patent Not Issued For This Number

4,999,215

METHOD FOR MANUFACTURING POLYIMIDE THIN FILMS BY PLASMA POLYMERIZATION

Yoshiro Akagi, Osaka; Mariko Ishino; Atsuhisa Inoue; Shigeru Kaminishi, and Hiroshi Taniguchi, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 29, 1989, Ser. No. 459,375
Claims priority, application Japan, Dec. 29, 1988, 63-332347
Int. Cl.[5] B05D *3/06*; B32B *15/08, 17/10, 27/34*
U.S. Cl. 427—41 14 Claims



1. A method of manufacturing a polyimide thin film which comprises supplying into a plasma atmosphere vapors of a polyimide starting material comprising a plurality of polyimide forming monomers including the combination of an acid anhydride and an amine compound which are mixed at a stoichiometric ratio capable of forming a polyimide, whereby ionized polyimide starting material is formed,

transferring the ionized polyimide starting material, under an electric field, to the surface of a substrate comprising metal of glass and depositing said ionized polyimide starting material thereon, and

heating said substrate during or after deposition, thereby forming one polyimide thin film on the substrate.

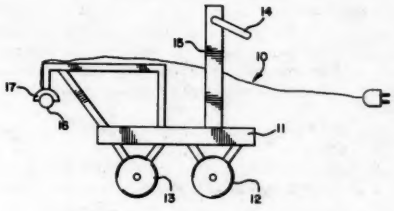
4,999,216

METHOD OF COATING CONCRETE FLOORS WITH PHOTOCURABLE COATINGS

Joseph Gaske, Mt. Prospect; John J. Krajewski, Wheeling, and Gerry K. Noren, Hoffman Estates, all of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Aug. 21, 1989, Ser. No. 396,853
Int. Cl.[5] B05D *3/06*
U.S. Cl. 427—44 19 Claims

1. A method of coating a concrete floor comprising coating said floor with a homogeneous liquid coating composition comprising a vinyl ether monomer, oligomer or polymer; a polyethylenic maleic or fumaric polyester and a ketonic photoinitiator, allowing the wet coating to seep into the concrete



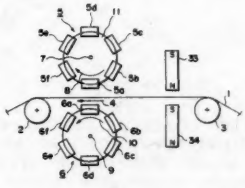
surface and to flow out on the concrete surface to form a smooth coating, and curing said coating by exposing the same to light having a wavelength in the range of from about 200 to about 600 nanometers.

4,999,217

PROCESS FOR PRODUCING MAGNETIC RECORDING MEDIUM

Yukio Watanabe, Machida; Shigeru Hashimoto, and Nobuyuki Hosoi, both of Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 75,989, Jul. 21, 1987, abandoned. This application Feb. 3, 1989, Ser. No. 306,210
Claims priority, application Japan, Jul. 29, 1986, 61-176663
Int. Cl.[5] B05D *3/14*
U.S. Cl. 427—48 8 Claims



1. A process for producing a magnetic recording medium comprising the steps of:

(a) coating a nonmagnetic substrate with a magnetic paint to form a raw fabric;

(b) applying a magnetic field to the raw fabric for passing magnetic lines of force from a back face to a front surface of said raw fabric or from the front surface to the back surface of said raw fabric for preliminarily orienting said magnetic paint; and

(c) applying a rotating magnetic field for circumferentially orienting said preliminarily oriented magnetic paint by rotating magnetic poles, the relative position of the rotating magnetic poles and the raw fabric being substantially constant during said circumferential orientation;

said steps (b) and (c) being conducted with the magnetic paint in an unsolidified state.

4,999,218

PREVENTION OF EFFLORESCENCE PHENOMENA ON MINERAL SUBSTRATES

Gerd Rehmer, Bobenheim-Roxheim; Manfred Schwartz, Ludwigshafen, and Bernhard Dotzauer, Maxdorf, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Aug. 8, 1989, Ser. No. 390,836

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1988, 3827975

Int. Cl.[5] B05D *3/06*

U.S. Cl. 427—54.1 **5 Claims**

1. A process for preventing efflorescence phenomena on mineral substrates by coating the surface of the mineral substrates with an aqueous polyacrylate dispersion and drying the coating, if necessary at elevated temperatures, wherein a mixture of

(A) a 20–65% strength by weight aqueous dispersion of a copolymer of

(a) from 20 to 70%, based on the weight of the copolymer, of (meth)acrylates of alkanols which are of 3 to 20 carbon atoms and have a tertiary CH group,

(b) from 30 to 60%, based on the weight of the copolymer, of styrene, α-methylstyrene, methyl methacrylate, tert-butyl (meth)acrylate and/or (meth)acrylonitrile and.

(c) from 0.2 to 7%, based on the weight of the copolymer, of mono- and/or dicarboxylic acids of 3 to 5 carbon atoms and/or their amides which may be substituted at the N atom by alkyl of 1 to 4 carbon atoms, the said dispersion having a minimum film-forming temperature of from −30° to +30° C., and

(B) from 0.1 to 5% by weight, based on the amount of the copolymer present in component (A) of an aromatic ketone

is used for the coating, and the coating is exposed to ultraviolet light while it is being dried and/or after it has been dried.

4,999,219

METHOD FOR COATING PHOSPHOR PARTICLES USING ALUMINUM ISOPROPOXIDE PRECURSORS AND AN ISOTHERMAL FLUIDIZED BED

Keith A. Klinedinst, Marlborough, and Richard A. Gary, Everett, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Nov. 7, 1989, Ser. No. 432,941

Int. Cl.[5] B05D *5/12;* **H01J** *1/70*

U.S. Cl. 427—69 **1 Claim**

1. A method for forming a continuous coating on phosphor particles of a fine phosphor powder comprising:

a) vaporizing aluminum isopropoxide into an inert carrier gas at a temperature below the decomposition temperature of the aluminum isopropoxide to form a carrier gas containing vaporized aluminum isopropoxide;

b) passing said carrier gas containing aluminum isopropoxide through a mixture of fine phosphor powder and up to 1 weight percent of a fluidizing aid to form a fluidized bed in which the particles are suspended in the carrier gas and to envelop the fluidized particles with vapor of aluminum isopropoxide, said fluidized bed being maintained at a nearly isothermal condition and at a temperature above approximately 300° C.:

c) agitating particles with agitating means in the fluidized bed while said particles are suspended in the fluidized bed by the carrier gas: and

d) passing oxidizing gas into said fluidized bed separately from said carrier gas containing vaporized aluminum isopropoxide and reacting said oxidizing gas with the vaporized aluminum isopropoxide on the particles of phosphor powder to form a continuous coating of predetermined thickness on the phosphor particles.

4,999,220

METHOD FOR MANUFACTURING PERPENDICULAR MAGNETIC RECORDING MEDIUM

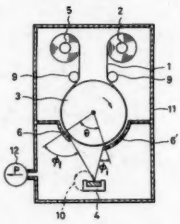
Kazuyoshi Honda, Takatsuki; Ryuji Sugita; Kiyokazu Tohma, both of Hirakata; Yasuihiro Kawawake, Takatsuki, and Yoshiki Murakami, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Feb. 16, 1989, Ser. No. 310,994

Claims priority, application Japan, Feb. 17, 1988, 63-34213; Nov. 17, 1988, 63-291155; Nov. 29, 1988, 63-301172

Int. Cl.[5] H01F *10/02*

U.S. Cl. 427—132 **11 Claims**



1. In a method for manufacturing perpendicular magnetic recording medium wherein a magnetic layer containing Co and Cr as main contents or Co, Cr and Ni as main contents on a running substrate of polymer film

the improvement that

incident angle of vaporized atom to form said magnetic layer has 30′ or larger at the side of ending of vacuum deposition and

said magnetic layer is heated in an oxygen-containing atmosphere.

4,999,221

PROCESS FOR PLASTIC COATING, AND COATING PRODUCED BY THE PROCESS

Volkmar Eigenbrod, Kapellstrasse 30, 4000 Düsseldorf 30, and Hans-Jürgen Hendriock, Burghausen, both of Fed. Rep. of Germany, assignors to Volkmar Eigenbrod, Düsseldorf and Hoechst Aktiengesellschaft, Frankfurt am Main, both of, Fed. Rep. of Germany

Continuation of Ser. No. 88,946, Aug. 24, 1987, abandoned. This application Dec. 22, 1989, Ser. No. 456,072

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1986, 3628670

Int. Cl.[5] B05D *3/02*

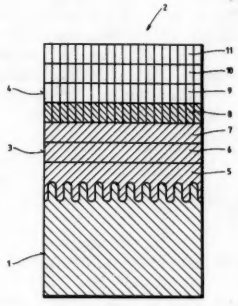
U.S. Cl. 427—195 **11 Claims**

1. A process of powder coating a high temperature resistant surface with fluorothermoplastics material comprising:

(a) applying to said surface a base layer of a powdered fluorothermoplastics material having a first melting temperature and sintering the base layer at a baking temperature of the first thermoplastics material selected,

(b) then applying over the base layer a covering layer of a powdered second fluorothermoplastics material having a

lower melting temperature and the same or increased flowability than said first melting temperature, and heating the covering layer to a temperature below said first melting temperature to fuse the coating.



4,999,222

METALLIZED POLYETHYLENE PLEXIFILAMENTARY FILM-FIBRIL SHEET

David C. Jones, Midlothian, and Chi-Chang Lee, Richmond, both of Va., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Jul. 10, 1989, Ser. No. 377,682
Int. Cl.[5] C23C *16/00*
U.S. Cl. 427—250 6 Claims

1. A process for preparing a metallized polyethylene plexifilamentary film-fibril sheet having an emissivity on at least one side of from 0.06 to 0.18 comprising:

(a) hot calendering a polyethylene plexifilamentary film-fibril sheet to a specular gloss on at least one side of at least 28 percent by passing the sheet through a nip, with a pressure of at least 18 kilograms per centimeter, wherein a first roll in the nip is a metal roll with a surface smoothness of no greater than 5 rms micro-inch and is maintained at a temperature sufficient to heat a surface of the sheet to between 0° to 8° C. below the melting point of the polyethylene sheet and a second roll in the nip has a 70 Shore A durometer hardness or less;

(b) vapor depositing a metal on the calendered side of the sheet.

4,999,223

CHEMICAL VAPOR DEPOSITION AND CHEMICALS WITH DIARSINES AND POLYARSINES

Ravi K. Kanjolia, North Andover, and Benjamin C. Hui, Peabody, both of Mass., assignors to CVD Incorporated, Woburn, Mass.

Filed Feb. 22, 1990, Ser. No. 484,720
Int. Cl.[5] B05D *5/12*; C23C *16/18, 16/30*
U.S. Cl. 427—252 3 Claims

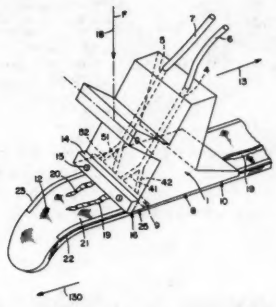
1. In a process for vapor deposition for producing an arsenic-containing film on a substrate by thermally decomposing a vaporous organo arsenic compound on a heated substrate or a chemical doping process in which an organo arsenic compound is used to introduce arsenic atoms into a substrate, the improvement comprising said organo arsenic compound being a diarsine or a polyarsine having As-As bonds.

4,999,224

METHOD AND DEVICE FOR COATING SKI SOLES

Jean-Pierre Bocquet, La Motte Servolex, and Daniel Vieau, Le Bourget du Lac, both of France, assignors to SKID, societe anonyme, La Motte Servolex, France

Filed Sep. 28, 1989, Ser. No. 414,189
Claims priority, application France, Sep. 29, 1988, 88 13137; Oct. 11, 1988, 88 13998; Mar. 3, 1989, 89 03264
Int. Cl.[5] B05C *1/02*
U.S. Cl. 427—356 21 Claims



1. A method of coating a ski sole comprising:

continuously feeding a thermoplastic filling material in solid form into a heating body formed as a spreader shoe;

progressively softening the filling material in the body;

bringing the filling material in liquid form to a transverse groove under the shoe;

distributing the filling material in the transverse groove under the shoe;

spreading the filling material over the ski sole by moving the spreader shoe with respect to the ski surface at a controlled speed so that, at the end of the spreading zone, the thermoplastic material remains sufficiently viscous to allow spreading; and

driving the filling material under pressure by a transverse scraper wherein the scraper comprises a sharp, transverse, substantially rectilinear edge separating a front scraper face and a rear scraper face, said front scraper face forming an angle between 45 and 75 degrees with the ski surface.

4,999,225

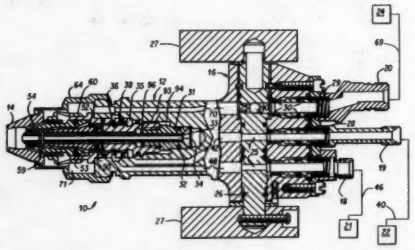
HIGH VELOCITY POWDER THERMAL SPRAY METHOD FOR SPRAYING NON-MELTABLE MATERIALS

Anthony J. Rotolico, Hauppauge; Burton A. Kushner, Old Bethpage, and Amr Aly, Forest Hills, all of N.Y., assignors to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Jan. 5, 1989, Ser. No. 290,928
Int. Cl.[5] B05D *1/08*
U.S. Cl. 427—423 10 Claims

1. A method for producing a dense and tenacious coating with a thermal spray gun including a nozzle member with a nozzle face, and a tubular gas cap extending from the nozzle member and having an inwardly facing cylindrical wall defining a combustion chamber with an open end and an opposite end bounded by the nozzle face, the method comprising injecting an annular flow of a combustible mixture of a combustion gas and oxygen from the nozzle coaxially into the combustion chamber at a steady pressure therein of at least two bar above atmospheric pressure, injecting an annular outer flow of pressurized non-combustible gas adjacent to the cylindrical wall radially outward of the annular flow of the combustible mixture, feeding a powder comprising polymer particles having heat stable non-meltable cores and heat softenable surfaces in a

carrier gas axially from the nozzle into the combustion chamber, injecting an annular inner flow of pressurized gas from the nozzle member into the combustion chamber coaxially between the combustible mixture and the powder-carrier gas,



combusting the combustible mixture, whereby a supersonic spray stream containing the heat fusible material in finely divided form is propelled through the open end, and directing the spray stream toward a substrate such as to produce a coating thereon.

4,999,226

PHARMACEUTICAL COMPOSITIONS FOR PIPERIDINOALKANOL-IBUPROFEN COMBINATION

Herbert Schock, Cincinnati; David F. Long, Loveland, and William R. Nadler, Cincinnati, all of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Continuation of Ser. No. 200,817, Jun. 1, 1988, abandoned. This application Apr. 27, 1989, Ser. No. 344,183

Int. Cl.[5] A61K *9/24*

U.S. Cl. 424—472 **10 Claims**

1. A multi-layered pharmaceutical tablet in a solid unit dosage form comprising:

(a) a layer comprising a therapeutically effective analgesic and antipyretic amount of ibuprofen or a pharmaceutically acceptable salt thereof, in admixture with pharmaceutically acceptable excipients;

(b) a layer comprising a therapeutically effective antihistaminic amount of a piperidinoalkanol or a pharmaceutically acceptable salt thereof, in admixture with pharmaceutically acceptable excipients, and;

(c) a layer comprising a pharmaceutically inert excipient, which is interspersed between said ibuprofen containing layer and said piperidinoalkanol containing layer in order to provide a barrier layer there between.

4,999,227

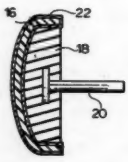
BUMPER AND PROCESS TO BOND IONOMERS TO PLASTIC

Robbert T. Vander Togt, 75B Buffalo Street, Brantford, Ontario, Canada N3R 1E1

Filed May 7, 1990, Ser. No. 519,865

Int. Cl.[5] B32B *3/26*

U.S. Cl. 428—31 **18 Claims**



14. A decorative, structural automotive bumper comprising:

a shell of metal-platable grade plastic resin, said shell having exterior surfaces and interior surfaces,

said exterior and interior surfaces plated with a decorative layer of metal, and

a core of substantially rigid but resilient foamed ethylene ionomer bonded to said interior surfaces,

wherein said bumper is made by a process comprising:

plating said exterior and interior surfaces with said metal layer and then foam injection molding the core to the metal layer over the interior surfaces.

4,999,228

SILICON CARBIDE DIFFUSION TUBE FOR SEMI-CONDUCTOR

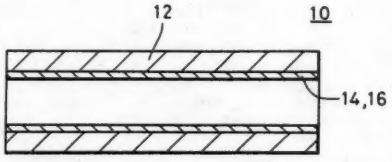
Fukuji Matsumoto, Takefu; Yoshio Tawara, Fukui, and Michio Hayashi, Takefu, all of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed May 3, 1989, Ser. No. 346,736

Claims priority, application Japan, May 6, 1988, 63-109211; May 6, 1988, 63-109212

Int. Cl.[5] F27D *5/00*; B05D *3/14*

U.S. Cl. 428—34.4 **12 Claims**



1. A silicon carbide type diffusion tube comprising a diffusion tube base made of reaction-sintered silicon carbide having an iron concentration of 20 ppm or below and a density of 3.0 g/cm^3 or over, and a silicon carbide layer comprising a high-purity silicon carbide film having an iron concentration of 5 ppm or below and a thickness of 500 to 2000 μm deposited on the inner surface of the tube base.

4,999,229

MULTILAYERED PACKAGING MATERIALS HAVING HIGH GAS BARRIER PROPERTY

Tohei Moritani; Susumu Fukutome; Yasuo Motoishi, and Hidemasa Oda, all of Kurashiki, Japan, assignors to Kuraray Co., Ltd., Kurashiki, Japan

Filed Dec. 29, 1988, Ser. No. 291,732

Claims priority, application Japan, Dec. 29, 1987, 62-335823; Feb. 1, 1988, 63-22580

Int. Cl.[5] B29D *22/00*

U.S. Cl. 428—36.6 **21 Claims**

1. A gas-barrier multilayered packaging material, comprising:

a barrier layer adapted to contact a moist environment during retort or boil sterilization procedures, comprising 55–97% by weight of an ethylene vinyl alcohol polymer having an ethylene content of 20–50 mol % and 45 to 3% by weight of a resin selected from the group consisting of polyamide resin, polyolefin resin, polyester resin and polycarbonate resin; and

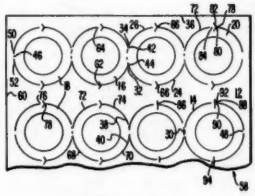
a layer of a hydrophobic thermoplastic resin having a low moisture permeability in contact therewith.

4,999,230

PIRN MARKER SHEET AND METHOD FOR FORMING THE SAME

Alfred R. Pipkins, 3776 Court Dr., Theodore, Ala. 36582

Continuation-in-part of Ser. No. 413,762, Sep. 28, 1989, Pat. No. 4,944,978. This application Jul. 25, 1990, Ser. No. 557,019
Int. Cl.[5] B32B *3/10*
U.S. Cl. 428—43 20 Claims



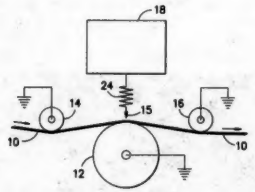
1. A sheet of circular pirn markers which are removable from the remainder of the sheet as an interconnected row of pirn markers comprising a sheet of material having at least one row of pirn markers formed therefrom and connected thereto, said row including first and second end pirn markers and one or more intermediate pirn markers therebetween, each end pirn marker being connected at one side thereof along a line of joinder to an intermediate pirn marker and at an opposite side thereof by an end connection point to the remainder of said sheet, each such end and intermediate pirn markers having opposed sides defined by opposed arcuate cuts extending through said sheet, said opposed arcuate cuts being spaced to provide at least one additional intermediate connection point between each pirn marker and the sheet.

4,999,231

METHOD AND PRODUCT TO ENHANCE ELECTRICAL CONDUCTIVITY OF FILMS CONTAINING CONDUCTIVE CARBON BLACK

James E. Fowler, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Continuation-in-part of Ser. No. 342,006, Apr. 24, 1989, abandoned. This application Feb. 5, 1990, Ser. No. 475,399
Int. Cl.[5] D04H *1/04*
U.S. Cl. 428—95 9 Claims



1. The method of enhancing the electrical conductivity of a carbon containing film comprising the steps of: supplying a carbon containing film, passing the film over a grounded metal roll, applying a voltage to the film at a plurality of points from electrodes spaced across the surface thereof to create a series of arcs between the electrode and the film to create small crater-like holes only in the surface of the film and moving the film past the electrodes to form a plurality of lines of small crater-like holes in the film.

6. A carpet with enhanced anti-static properties comprising: an upper surface with yarns projecting upwardly therefrom and a lower carbon containing film material adhered to the upper surface to provide stability thereto, the bottom of said film material having a series of rows of crater-like holes only in the surface thereof to increase the electrical conductivity of the carpet.

4,999,232

MAKING NEW STRETCHABLE BATTS

Martin D. LeVan, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 16, 1990, Ser. No. 494,707
Int. Cl.[5] B32B *5/12*
U.S. Cl. 428—113 9 Claims

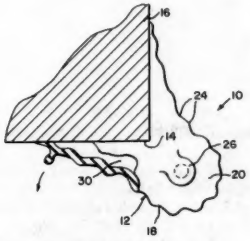
6. A multi-layered, cross-lapped, stretchable batt having recoverable extensions in the plane of the layers that are balanced to the extent such that the maximum recoverable extension is no more than about 1.5 times the recoverable extension in the direction at right angles to the direction of maximum recoverable extension, and comprising bicomponent fibers that have a helical curl on account of bicomponent differential shrinkage.

4,999,233

PROTECTIVE GUARD MEMBER

Bernard Probst, 103 Crockett St., Cleveland, Tex. 77327, and George Spector, 233 Broadway, New York, N.Y. 10007

Filed Feb. 20, 1990, Ser. No. 482,011
Int. Cl.[5] E04F *13/06*
U.S. Cl. 428—122 2 Claims



1. A protective bumper comprising:

(a) an elongated resilient body adapted to engage, cover and cushion a sharp structural corner on a wall and

(b) suction means incorporated in said body for securing said body in place along said sharp corner to prevent injury to a child falling against said sharp corner,

(c) said body having side walls enclosing a space between said corner and body; wherein said body is U-shaped in cross section having a top wall and a plurality of longitudinal vertical ribs on said bumper to provide greater flexibility for vacuum producing purposes; wherein said suction means includes

(d) a one way valve flap formed on said top wall, permitting air flow from said space and

(e) an air pump reciprocable button formed on said bumper so that when said bumper is placed against said corner, said air pump button can be pushed in to force air out through said valve flap creating suction to secure the bumper on said corner.

4,999,234

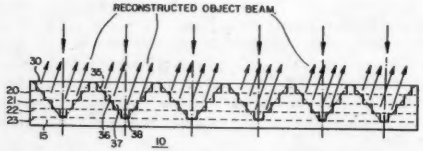
HOLOGRAPHIC OPTICAL DATA STORAGE MEDIUM

James J. Cowan, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 84,568, Aug. 10, 1987, Pat. No. 4,888,260. This application Jun. 10, 1988, Ser. No. 205,376
The portion of the term of this patent subsequent to Dec. 19, 2006, has been disclaimed.
Int. Cl.[5] B02B *3/00*; G11B *3/70*
U.S. Cl. 428—156 7 Claims

1. An optical data storage medium comprising a substrate which has formed therein at least one terraced depression whose terraces are located depthwise in said substrate at interference planes corresponding to a volume phase reflection hologram so that said terraced depression operates as a volume

phase reflection hologram which, when illuminated, provides predetermined optical effects, said substrate being responsive to predetermined external stimuli to produce detectable



changes in said predetermined optical effects such that said changes operate as a means for encoding information in said substrate.

4,999,235

CONFORMABLE, STRETCHABLE SURGICAL WOUND CLOSURE TAPE

Anthony C. Lunn, Princeton, and Frank V. Mattei, Piscataway, both of N.J., assignors to Ethicon, Inc., Somerville, N.J.

Continuation of Ser. No. 77,544, Jul. 24, 1987, abandoned. This application Jul. 27, 1989, Ser. No. 387,438

Int. Cl.[5] B32B *33/00*

U.S. Cl. 428—156 **6 Claims**

1. In a wound closure tape comprising a nonwoven fabric having a pressure-sensitive adhesive uniformly disposed over one surface thereof, the improvement wherein the nonwoven fabric comprises a web of continuous thermoplastic filaments that are randomly disposed in the plane of the web and bonded in an intermittent pattern of emboss bonded areas, said filaments being substantially free of interfilament bonding except in said emboss bonded areas, and wherein said tape having a width of from $\frac{1}{4}$ inch to $\frac{1}{2}$ inch has a stress at 20% elongation of from about 4 to 8 pounds/inch width.

4,999,236

FIRE RESISTANT SURFACES FOR HOT AIR BALLOONS

Francis P. McCullough, Jr., Lake Jackson, Tex., and Robert L. Matoy, Saginaw, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jun. 8, 1989, Ser. No. 363,231

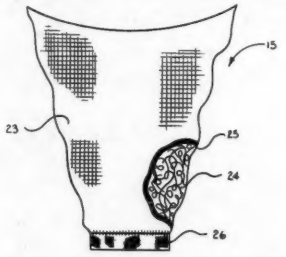
Int. Cl.[5] B32B *9/00, 33/00;* B64B *1/58*

U.S. Cl. 428—233 **7 Claims**

1. A composite fabric comprising, in combination

a woven outer ply of light weight fabric selected from the group consisting of polyester and ripstop nylon, and

an inner layer of a fibrous structure comprising nonflammable heat set carbonaceous polymeric fibers having an LOI value greater than 40, an aspect ratio greater than 10:1, a



carbon content less than 85% and a thermal conductivity less than 1 BTU ft/Hr ft.^{2}°F. bonded to said outer ply.

4,999,237

CUSHION INSOLE/INSOCK MATERIAL

Harry Mellors, Leicester, and Susan G. Johnson, Desford, both of England, assignors to British United Shoe Machinery Ltd., Leicester, England

Filed Aug. 14, 1990, Ser. No. 567,279

Claims priority, application United Kingdom, Aug. 25, 1989, 8919389

Int. Cl.[5] D04H *1/08*

U.S. Cl. 428—280 **24 Claims**

1. Material for cushion insoles and insocks comprising a non-woven low-density felt having a thickness of between 3 and 10 mm, said felt being manufactured from fibres and being impregnated with a resilient rubbery impregnant, wherein the fibres have a decitex of between 5 and 17 and a staple length of between 30 and 80 mm, and the density of the impregnated felt is in the order of 0.08 to 0.20 g/cm^3.

4,999,238

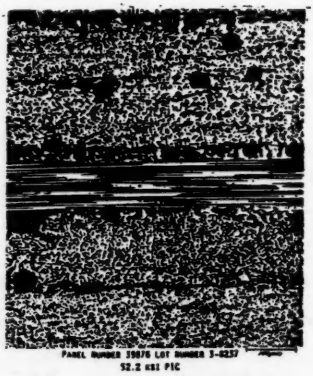
DAMAGE TOLERANT COMPOSITES CONTAINING INFUSIBLE PARTICLES

Irena Gawin, Sandy, Utah, assignor to Hercules Incorporated, Wilmington, Del.

Continuation of Ser. No. 31,958, Mar. 30, 1987, abandoned, which is a division of Ser. No. 884,139, Jul. 9, 1986, Pat. No. 4,863,787. This application Apr. 3, 1989, Ser. No. 338,520

Int. Cl.[5] B32B *5/16;* C08K *7/02*

U.S. Cl. 428—283 **5 Claims**



1. A multi-layer damage tolerant, structural composite, said composite comprising:

(a) a crosslinked epoxy matrix which, when cured without any of said high strength filaments, has a K_{IC} greater than 1 MPa m;
(b) high strength filaments within said matrix in the form of tows or rovings which comprise a multitude of said filaments, said tows or rovings being in layers extending through said composite;
(c) infusible particles made of a rubber polymer and having a median particle size between 10 and 75 microns, more of said particles having a dimension greater than 10 microns being between said layers rather than between filaments of said tows or rovings.

4,999,239

ETHYLENE-VINYL CHLORIDE COPOLYMER EMULSIONS CONTAINING TETRAMETHYLOL GLYCOLURIL FOR USE AS BINDER COMPOSITIONS

John G. Iacoviello; George Davidowich, both of Allentown; Bheema R. Vijayendran, Emmaus, and John S. Sadowski, Kutztown, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Division of Ser. No. 326,144, Mar. 30, 1989, Pat. No. 4,962,141. This application May 31, 1990, Ser. No. 531,974

Int. Cl.[5] B01D *39/18;* **B32B** *27/26, 27/30*

U.S. Cl. 428—288 **17 Claims**

1. A nonwoven product exhibiting resistance to degradation caused by hot oil comprising a nonwoven web of fibers bonded together with a copolymer deposited from an emulsion comprising an aqueous colloidal dispersion having (a) 20 to 70% solids of a copolymer consisting essentially of 65 to 90 wt % vinyl chloride, 5 to 35 wt % ethylene and up to 10 wt % of a hydroxyalkyl- or carboxylic acid-containing functional comonomer, the copolymer being prepared in the presence of a stabilizing system consisting essentially of 3 to 15 wt % polyvinyl alcohol which is 70 to 91 mole % hydrolyzed.

4,999,240

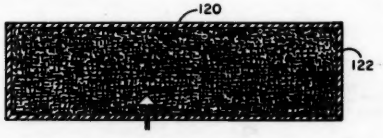
METALIZED FIBER/MEMBER STRUCTURES AND METHODS OF PRODUCING SAME

Gregory R. Brotz, P.O. Box 1322, Sheboygan, Wis. 53081

Continuation-in-part of Ser. No. 888,579, Jul. 21, 1986, abandoned, which is a continuation-in-part of Ser. No. 696,458, Jan. 30, 1985, abandoned. This application Apr. 26, 1988, Ser. No. 186,391

Int. Cl.[5] B32B *5/06, 15/04;* **D04H** *1/58;* **E04C** *1/00*

U.S. Cl. 428—288 **1 Claim**



1. A carbonized material comprising:
a plurality of fibers having a thickness in the range of 10–1000 microns irregularly arranged with portions of some of said fibers contacting other portions of some of said fibers to form a plurality of junctions at said points of contact;
a carbonized coating having a thickness of 1–200 microns coated over said fibers and solidified, holding and retaining said fibers together at said junctions to form a carbonized integral structural material, said carbonized resin coating binding said structural material into a sturdy, rigid mass; and
metallic plating of 200–1000 microns in thickness plated on said resin-coated integral structural material, said plating further strengthening said structural material, said structural material molded in a desired shape as it is being formed, said structural material being electrically conductive.

4,999,241

COILED STEEL STRIP WITH SOLID LUBRICANT COATING

Phillip L. Coduti, Munster, Ind., and Louis McDaniel, Lansing, Ill., assignors to Inland Steel Company, Chicago, Ill.

Continuation of Ser. No. 294,682, Jan. 9, 1989, abandoned. This application Jul. 20, 1990, Ser. No. 555,651

Int. Cl.[5] B32B *15/04;* **B21B** *45/02*

U.S. Cl. 428—340 **17 Claims**

1. A coil of pre-lubed steel strip, said strip comprising:
a steel strip substrate;
and a uniform coating of solid lubricant on each surface of said substrate;
said coating having a coating weight greater than 20 mg/ft.^{2} (0.22 g/m^2) for lubricity purposes and less than 95 mg/ft.^{2} (1.03 g/m^2) to prevent slippage during operations incident to the blanking of the coiled strip;
said coating having a needle penetration hardness number in the range 9–250.

4,999,242

RADIATION-CURABLE ADHESIVE TAPE

Shinichi Ishiwata, Hiratsuka; Michio Ueyama, Yokohama; Hiroyuki Nakae, Kawasaki; Yoshiyuki Funayama, Yokohama; Kazushige Iwamoto, Hiratsuka, and Isamu Noguchi, Tokyo, all of Japan, assignors to Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Jul. 7, 1988, Ser. No. 216,269

Claims priority, application Japan, Jul. 8, 1987, 62-168515; Mar. 31, 1988, 63-76185; Mar. 31, 1988, 63-76186; Apr. 1, 1988, 63-78201; Apr. 1, 1988, 63-78202

Int. Cl.[5] B32B *7/12, 15/04;* **C08J** *3/28*

U.S. Cl. 428—345 **25 Claims**

1. A radiation-curable adhesive tape which comprises a radiation-curable adhesive layer that is formed on a radiation-transmitting substrate that contains 100 parts by weight of an acrylic adhesive, 5 to 500 parts by weight of a compound having a carbon-carbon double bond, and 0.01 to 20 parts by weight of a silicone acrylate compound.

4,999,243

FAR INFRA-RED RADIANT COMPOSITE FIBER

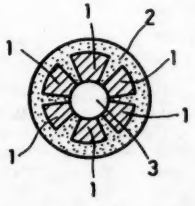
Nobushige Maeda, 3-14-11, Shimo-Shakujii, Nerima-ku Tokyo, Japan

Continuation of Ser. No. 132,168, Dec. 14, 1987, abandoned. This application Oct. 25, 1989, Ser. No. 427,950

Claims priority, application Japan, Dec. 15, 1986, 61-298098

Int. Cl.[5] D02G *3/00*

U.S. Cl. 428—372 **14 Claims**



1. A far infra-red radiant composite fiber composed of a core of fiber produced from a polyamide containing 10 to 70 percent by weight of a far infra-red radiant grained material covered with a sheath of fiber produced from a polyamide containing 1 to 10 percent by weight of a far infra-red radiant grained material, wherein said far infra-red radiant grained material in said core and said far infra-red radiant grained material in said sheath are selected from the group consisting of alumina, zirconia, titanium oxide, and mixtures thereof of a purity of at least

95%, and have a far infra-red emissivity of at least 65% on an average in the spectral range form 4.5 μm to 30 μm at 30° C.

4,999,244

COMPOSITE ORGANIC FILAMENTS

Shingo Morimoto, Omachi, Japan, assignor to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 28, 1988, Ser. No. 264,109
Claims priority, application Japan, Oct. 30, 1987, 62-275508
Int. Cl.[5] D02E *3/00*
U.S. Cl. 428—372 5 Claims

1. A composite organic filament comprising an organic resin matrix and 2 to 70 wt. % of extrafine fiber-like segments uniformly distributed throughout the organic resin matrix, wherein said extrafine fiber-like segments comprise carbon fibers produced by a vapor phase growth process, said carbon fibers having a diameter of from 0.1 to 1.0 micrometers and a length of from 3 to 500 micrometers and wherein said composite organic filament is produced by spinning said filament.

4,999,245

MULTI-LAYERED CONJUGATED ACRYLIC FIBERS AND THE METHOD FOR THEIR PRODUCTION

Shoji Orino; Hiroyosh Tanaka, and Akiteru Kuroda, all of Ehime, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Mar. 1, 1988, Ser. No. 162,652
Int. Cl.[5] D02G *3/00*
U.S. Cl. 428—374 7 Claims

1. A multi-layered conjugated acrylic fiber comprising different acrylic polymers containing 80 mole % or more of acrylonitrile, these polymers being conjugated along the fiber axis in an average number of more than 2 layers, the shrinkage forming ratio in boiling water of the conjugated acrylic fiber being 7–15%, and the shrink forming stress of said fiber in dry heat being 5–20 mg/denier.

4,999,246

GLASS LAMINATED STRUCTURE, LAMINATING APPARATUS, AND METHODOLOGY

Kurt E. Jechel, San Juan Capistrano, and Jerome C. Schutzler, Laguna Niguel, both of Calif., assignors to PDA Engineering, Costa Mesa, Calif.

Division of Ser. No. 19,234, Feb. 26, 1987, Pat. No. 4,806,191.
This application Nov. 4, 1988, Ser. No. 267,500
Int. Cl.[5] B32B *17/00*; E04C *2/54*
U.S. Cl. 428—192 12 Claims

1. A glass laminated structure, comprising:

first and second glass panels in generally parallel, spaced-apart juxtaposition having inwardly facing inner surfaces and oppositely disposed outer surfaces, each of the first and second glass panels having a circumscribing peripheral edge extending between the inner and outer surfaces and each of the outer surfaces having a marginal portion extending to the peripheral edge;

first and second frame members in generally parallel, spaced-apart juxtaposition circumscribing regions of the first and second glass panels, respectively, each of the first and second frame members overlapping a respective one of the marginal portions of the glass panels;

frame sealing means for sealing each of the first and second frame members to the respective marginal portion;

a core of cured material disposed between the glass panels and between the frame members and adhering the glass panels and frame members together, said core having a higher coefficient of expansion than the glass panels;

the core having first and second shoulders disposed between the frame members in a position abutting the peripheral edges of the first and second glass panels, respectively; and

a seal member circumscribing said core at least partially between the first and second frame members.

9. A glass laminated structure comprising:

first and second glass panels in generally parallel, spaced apart relationship, each of said panels having a peripheral edge;

first and second frame members in generally parallel, spaced apart relationship and circumscribing regions of the first and second glass panels, respectively;

sealing means for sealing between the first panel and the first frame member and between the second panel and the second frame member;

a core of cured material between the glass panels and frame members and adhering the glass panels and frame members together; and

a seal circumscribing said core at least partially between the frame members.

4,999,247

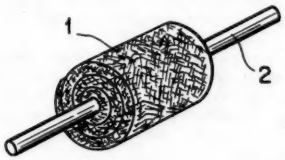
METHOD OF FORMING A COLORED COATING FILM ON A CROSS-LINKED POLYETHYLENE SHEET OR ELECTRIC WIRE

Yoshinobu Sugimoto; Yoshifumi Mizuguchi, both of Numazu, and Yoshinobu Hoshino, Osaka, all of Japan, assignors to Yazaki Corporation; Yazaki Electric Wire Co., Ltd. and Nippon Oil and Fats Co., Ltd., all of, Japan

Continuation of Ser. No. 832,737, Feb. 25, 1986, abandoned.
This application Mar. 20, 1989, Ser. No. 326,497
Claims priority, application Japan, Feb. 26, 1985, 60-035264; Mar. 26, 1985, 60-059428
Int. Cl.[5] B32B *27/00, 33/00*
U.S. Cl. 428—383 2 Claims

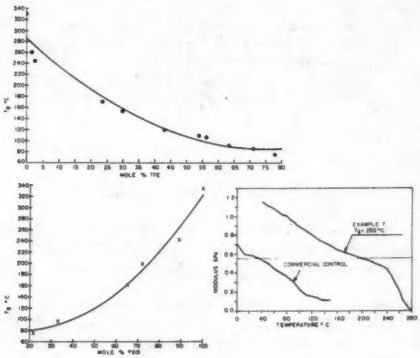
1. An electric wire insulated with a cross-linked polyethylene having a degree of cross-linking greater than 50% and having a colored coating UV radiation cured film on the surface thereof, said film comprising a coloring paint composed of a blend of a prepolymer having at least one member selected from the group consisting of acryloyl and methacryloyl groups in the molecule, a mono-functional monomer having a functional group selected from the group consisting of acryloyl and

methacryloyl groups and a multi-functional monomer having a functional group selected from the group consisting of acryloyl and methacryloyl groups in the molecule and a pigment, said film being coated on the surface of the cross-linked polyethylene in a thickness of less than about 10 μm and then cured by irradiation in air with UV-rays, the blending ratio of said prepolymer to said mono-functional monomer and said multi-functional monomer being within the range of from 95:5 to 5:95 parts by weight; said mono-functional monomer being selected from the group consisting of 2-ethylhexyl(metha)acrylate, 2-hydroxyethyl-(metha)acrylate, 2-hydroxypropyl(-metha)acrylate, tetrahydrofulfryl(meta)acrylate, hexyldi-



glycol(metha)-acrylate, (metha)acrylamide, methylol(metha)acrylamide and butoxymethyl(metha)acryl amide; said multi-functional monomer being selected from the group consisting of ethylene glycol di(metha)acrylate, diethyleneglycol di(metha)acrylate, triethyleneglycol di(metha)acrylate, polyethyleneglycol di(metha)acrylate, 1,6-hexanediol di(metha)acrylate, neopentylglycol di(metha)acrylate, bis-hydroxyethylenic bisphenol A diacrylate, bis-hydroxypropilenic bisphenol A diacrylate, trimethylolpropane tri(metha)acrylate, pentaerythritol tri(metha)acrylate, pentaerythritol tetra(metha)acrylate, dipentaerythritol pentaacrylate and dipentaerythritol hexaacrylate.

of the layers being a film or sheet of an amorphous dipolymer of 65–99 mole % of perfluoro-2,2-dimethyl-1,3-dioxole with a



complementary amount of tetrafluoroethylene, the glass transition temperature of the dipolymer being at least 140° C.

4,999,248

AMORPHOUS COPOLYMERS OF PERFLUORO-2,2-DIMETHYL-1,3-DIOXOLE

Edward N. Squire, Spring Hill, Fla., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 458,012, Dec. 28, 1989, which is a division of Ser. No. 148,579, Jan. 26, 1988, which is a division of Ser. No. 904,095, Sep. 4, 1986, Pat. No. 4,754,009, which is a continuation-in-part of Ser. No. 723,649, Apr. 16, 1985, abandoned, which is a division of Ser. No. 591,486, Mar. 20, 1984, Pat. No. 4,530,569, which is a continuation-in-part of Ser. No. 294,789, Aug. 20, 1981, abandoned. This application Apr. 9, 1990, Ser. No. 509,409

Int. Cl.[5] B32B *27/00*

U.S. Cl. 428—422 **3 Claims**

1. A layered structure consisting essentially of at least two films or sheets thermally laminated to one another, at least one

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4,999,249

MIXTURES CONTAINING ORGANOSILICON COMPOUNDS AND THEIR USE FOR WATERPROOFING AND ANTIMICROBIAL IMPREGNATION

Ulrich Deschler, Hanau; Ulrike Lechner, Offenbach, and Michael Witzel, Frankfurt, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Aug. 28, 1989, Ser. No. 399,586

Claims priority, application Fed. Rep. of Germany, Feb. 25, 1989, 3905919

Int. Cl.[5] B32B *9/04*

U.S. Cl. 428—447 **11 Claims**

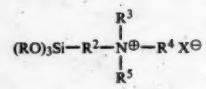
1. A composition for the treatment of inorganic, oxidic material comprising waterproofing and antimicrobial effective amounts of:

(a) $(RO)_3Si-R^1$, (I) in which:

R represents C_1-C_4-alkyl

R^1 represents C_1-C_{18}-alkyl

(b) A cationic trialkoxy silane of the general formula



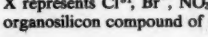
(II)

in which:

R^2 represents C_1-C_3-alkylene or $—CH_2—CH_2——CH_2$

R^3, R^4, R^5, which may be the same or different from each other, represent C_1–C_{18}-alkyl

X represents Cl^{a1}, Br^-, NO_3^-, I^-, CH_3COO^-, and/or an organosilicon compound of the general formula



(III)

in which

R^6 represents C_1–C_6-alkyl or aryl or fusion products of (a) and/or (b).

2. A composition according to claim 1 which contains a fusion product of an organosilicon compounds (a) or (b).

3. A composition according to claim 1 in which R is C_1–C_2-alkyl,

R^1 represents C_3–C_{18}-alkyl, R^6 represents n-butyl or phenyl.

4. A composition according to any one of claims 1, 2 or 3 in which the components (a) and (b) are dissolved or emulsified in a protic or aprotic solvent.

8. A method for the waterproofing and imparting antimicrobial characteristics to an inorganic, oxidic material which comprises applying thereto a composition according to claim 4.

4,999,250

COMPOSITION AND USE

Peter J. Richardson, Rochdale, and Bernard Tury, Prestwich, both of England, assignors to Imperial Chemical Industries plc, London, England

Filed Apr. 20, 1988, Ser. No. 184,400

Claims priority, application United Kingdom, Apr. 27, 1987, 8709896

Int. Cl.[5] B32B *15/04;* **C04B** *9/02*

U.S. Cl. 428—457 **19 Claims**

1. A corrosion inhibiting composition which comprises

(a) a salt of a metal (M) of a hydroxycarboxylic acid in which the hydroxy group and the carboxylic acid group are attached to the ring atoms of a fused ring system and wherein the metal (M) is at least divalent; and

(b) a surface coating compound or composition which is a film forming binder system, a natural oil, a natural grease or an oil or grease which is a petroleum refined product.

4,999,251

METHOD FOR TREATING POLYETHERIMIDE SUBSTRATES AND ARTICLES OBTAINED THEREFROM

Donald F. Foust, Scotia, and William V. Dumas, Delanson, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 3, 1989, Ser. No. 331,715

Int. Cl.[5] C23C *26/00*

U.S. Cl. 428—458 **11 Claims**

1. A method for modifying the surface of a polyethermide substrate to improve its adhesion characteristics for electrolessly deposited metal without the use of an adhesion promoter which consists essentially of

(A) treating the polyetherimide surface with a degreasing agent,

(B) modifying the degreased polyetherimide surface with concentrated sulfuric acid.

(C) treating the modified polyetherimide surface with an aqueous base to provide a pH of 14 or above,

(D) oxidizing the resulting polyetherimide surface of (C) with alkali metal permanganate resulting in the production of a manganese oxide residue, and

(E) effecting the removal of the manganese oxide residue from the polyetherimide surface by treating the polyetherimide surface with a reducing agent.

6. Metallized polyetherimide composite comprising a polyetherimide substrate having electrolessly deposited metal patterned thereon, where the polyetherimide substrate has been treated in accordance with claim 1.

4,999,252

PERMANENT ANTISTATIC ACID COPOLYMER/QUATERNARY AMINE MIXTURES FILMS

Marvin R. Havens, Greer, S.C., and William P. Roberts, Columbia, Md., assignors to W. R. Grace & Co.-Conn., Duncan, S.C.

Continuation-in-part of Ser. No. 143,885, Jan. 14, 1988. This application Sep. 26, 1988, Ser. No. 249,488

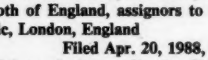
Int. Cl.[5] B32B *27/08*

U.S. Cl. 428—515 **1 Claim**

1. An antistatic film resultant from mixing with heat and forming into a film having layers (A) a polymer containing carboxylic acid moieties and (B) an antistatically effective amount of a quaternary amine wherein:

(A) the polymer containing carboxylic acid moieties is a copolymer of (i) a major of amount by mol % of an alpha-olefin of the formula $RCH=CH_2$ wherein R is H or C_1 to C_8 alkyl, and (ii) a minor amount by mol % of an alpha, beta-ethylenically unsaturated carboxylic acid, and

(B) the quaternary amine is of the formula



wherein

R^1 is selected from H, aryl, or C_1 to C_{50} alkyl optionally having one or more non-contiguous C═O or NHC═O or —S— or —O— in the carbon chain, or the same as R^2;

each of R^2, R^3, and R^4 is the same or different and selected from H, C_1 to C_{18} alkyl optionally substituted with one or more OH or from $—(R^5—O)_a—H$ where a is an integer from 1 to 10 and R^5 is ethylene or propylene; and

X is an anion selected from chloride, bromide, iodide, fluoride, nitrate, fluoborate, phosphate, C_1 to C_8 alkyl phosphate, sulfate, C_1 to C_8 alkyl sulfate, formate, C_1 to C_8 alkyl or C_6 to C_{24} alkaryl or aryl sulfonate, acetate, citrate, trifluoroacetate, propionate, tartrate, or carbonate,

which film will dissipate an applied charge of ±5000 Vdc in a static decay time less than about 3000 milliseconds and will have a surface resistivity from about 10^5 to about 10^{12} ohms/-square, after a 24 hour water shower, said film having 5 layers and each of the outside surface layers having the mixture of (A) and (B).

4,999,253

POLYVINYL BUTYRAL SHEET

Ashok Misra, New Delhi, India; Donald J. David, Amherst, and Arijit M. DasGupta, Holyoke, both of Mass., assignors to Monsanto Company, St. Louis, Mo.

Filed Nov. 7, 1988, Ser. No. 268,318

Int. Cl.[5] B32B *27/08*

U.S. Cl. 428—515 **25 Claims**

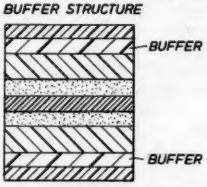
1. Plasticized piolyvinyl butyral sheet containing an effective amount of ionomeric groups chemically combined therein capable of producing thermally reversible cross-links.

4,999,254

INCREASED REGRIND USE IN COEXTRUDED STRUCTURES

David E. Ofstein, Williamsburg, Va., assignor to Rampart Packaging Inc., Williamsburg, Va.

Division of Ser. No. 444,572, Nov. 30, 1989, which is a division of Ser. No. 149,279, Jan. 28, 1988, Pat. No. 4,894,291. This application Sep. 21, 1990, Ser. No. 586,848
Int. Cl.[5] B32B 27/09
U.S. Cl. 428—518 17 Claims



1. A laminate for use in oxygen barrier applications which comprises:

(a) a protective outer layer which is comprised of polystyrene;

(b) an adhesive layer;

(c) an inner barrier layer comprised of a material selected from the group consisting of ethylene vinyl alcohol copolymers and polyvinylidene chloride;

(d) interposed between layers (a) and (b), an intermediate regrind layer formed of a blend of the materials from which (a), (b) and (c) are formed; and

(e) interposed between layers (a) and (d), a buffer layer which is formed from a blend of the materials from which layers (a) and (d) are formed and which comprises from about 5% to about 100% of the material of layer (d).

4,999,255

TUNGSTEN CHROMIUM CARBIDE-NICKEL COATINGS FOR VARIOUS ARTICLES

John E. Jackson, Brownsburg; Lynn M. McCaslin, Indianapolis; Anthony J. Stavros, Carmel, and Robert C. Tucker, Jr., Brownsburg, all of Ind., assignors to Union Carbide Coatings Service Technology Corporation, Danbury, Conn.

Filed Nov. 27, 1989, Ser. No. 441,712
Int. Cl.[5] B32B 15/16
U.S. Cl. 428—552 16 Claims

1. A coated article comprising a substrate coated with a tungsten chromium carbidenickel coating containing chromium-rich particles in which the weight of chromium in the chromium-rich particles is at least 3.5 times greater than the weight of tungsten in the chromium-rich particles and wherein said chromium-rich particles comprise at least about 4.5 volume percent of the coating.

4,999,256

MICROSTRUCTURALLY TOUGHENED METAL MATRIX COMPOSITE ARTICLE

Karl M. Prewo, Vernon; Vincent C. Nardone, Meriden, and James R. Strife, South Windsor, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 152,780, Feb. 5, 1988, Pat. No. 4,885,212. This application Oct. 24, 1988, Ser. No. 261,543
Int. Cl.[5] B22F 3/00
U.S. Cl. 428—552 7 Claims

1. A composite article extending along a first axis from a first end to a second end, comprising:

a plurality of metallic regions, each substantially continuously extending along the first axis from the first end to the second end,

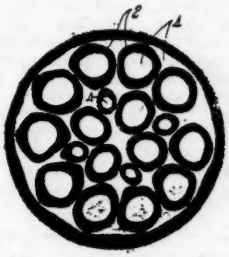
a plurality of discrete reinforced regions, each substantially continuously extending along the first axis from the first end to the second end,

wherein

each of the regions adjoins at least one of the other regions,

each of the regions is bonded to each of the regions which it adjoins,

each of the reinforced regions is separated from the other reinforced regions by a metallic region, and



at least two of the discrete reinforced regions are each enclosed in all directions perpendicular to the first axis by at least one metallic region each,

said metallic regions each comprising a metal alloy and said reinforced regions each comprising a metal alloy matrix reinforced with ceramic particles, and

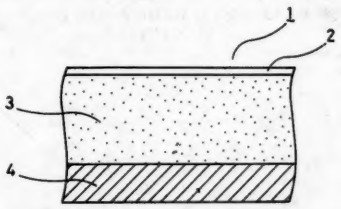
said composite article exhibiting high tensile strength parallel to the first axis, high elastic modulus parallel to the first axis, and high impact resistance perpendicular to the first axis.

4,999,257

BEARING MATERIAL FOR AN INTERNAL COMBUSTION ENGINE AND COMPRESSOR

Kiyoshi Imai, Chiba, Japan, assignor to NDC Company Ltd., Tokyo, Japan

Filed Feb. 1, 1989, Ser. No. 304,447
Int. Cl.[5] B22F 7/04
U.S. Cl. 428—555 4 Claims



1. A copper system bearing material comprising a backing material consisting of a steel strip, a sintered alloy layer formed on said backing material by sintering metal or alloy particles, a bearing layer formed on said sintered alloy layer consisting of a sintered alloy containing 14% to 20% by weight of lead and 4% to 10% by weight of tin, with the remainder being copper, and a copper cover layer consisting of copper formed on the surface of said backing material and serving to bond said backing material and said sintered alloy layer to each other.

4,999,258

THINLY TIN COATED STEEL SHEETS HAVING EXCELLENT RUST RESISTANCE AND WELDABILITY

Ryousuke Wake, and Kazuya Ezure, both of Himeji, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed May 19, 1988, Ser. No. 195,837
Claims priority, application Japan, May 20, 1987, 62-122856
Int. Cl.[5] B32B *15/04, 15/18*
U.S. Cl. 428—632 4 Claims

1. A steel sheet having at least on one side thereof a thin tin coating alloyed with zinc, excellent in rust resistance and weldability, produced by a process which comprises applying 0.2 to 1 g/m^2 of tin coating on a surface of a nickel coated cold rolled steel sheet, applying 0.01 to 0.3 g/m^2 of zinc coating on the tin coating in such an amount that the ratio of the zinc coating amount to the tin coating amount is in a range from 2 to 30% by weight, and heating the coatings to alloy substantially all of the zinc into the tin coating layer with substantially no non-alloyed zinc left on the tin coating.

4,999,259

CHROME-COATED STAINLESS STEEL HAVING GOOD ATMOSPHERIC CORROSION RESISTANCE

Misao Hashimoto; Satoshi Ito; Shunpei Miyajima; Wataru Ito, all of Kawasaki, and Tadashi Komori, Hikari, all of Japan, assignors to Nippon Steel Corp., Tokyo, Japan

Division of Ser. No. 380,731, Jul. 14, 1989. This application Nov. 17, 1989, Ser. No. 439,232
Claims priority, application Japan, Nov. 26, 1986, 61-279828
Int. Cl.[5] B32B *15/04*
U.S. Cl. 428—685 4 Claims

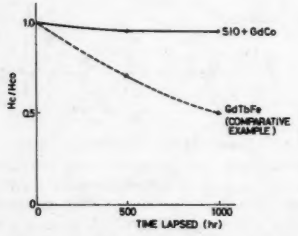
1. A chrome coated stainless steel having good adhesion, workability and atmospheric corrosion resistance comprising:
a stainless steel substrate having a surface;
a chrome coating by physical vapor deposition, having a thickness from 0.01 to 1.0 micrometers strongly adhered to said surface;
said chrome coating having an appearance similar to chrome plating conducted in an aqueous electrolyte.

4,999,260

MAGNETO-OPTICAL RECORDING MEDIUM COMPRISING A RARE-EARTH-TRANSITION METAL DISPERSED IN A DIELECTRIC

Ichiro Saito, Kawasaki; Yoichi Osato; Eiichi Fujii, both of Yokohama, and Kozo Arao, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 117,444, Nov. 3, 1987, abandoned, which is a continuation of Ser. No. 736,757, May 22, 1985, abandoned. This application Sep. 21, 1988, Ser. No. 246,970
Claims priority, application Japan, May 31, 1984, 59-109618; May 31, 1984, 59-109619; Jul. 2, 1984, 59-135335; Jul. 9, 1984, 59-140468; Jul. 11, 1984, 59-142278; Jul. 11, 1984, 59-142281
Int. Cl.[5] G11B *11/00*
U.S. Cl. 428—694 15 Claims



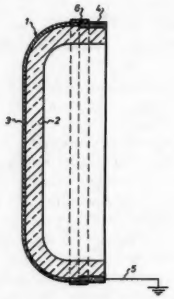
1. A magneto-optical record medium comprising:
a substrate; and
a magnetic record layer formed on said substrate, said magnetic record layer being a rare earth-transition metal alloy dispersed in a dielectric material, said magnetic record layer having an easy axis of magnetization normal to a plane defined by said magnetic layer.

4,999,261

DISPLAY SCREEN WITH REDUCED ELECTROSTATIC FIELD, METHOD AND MEANS FOR MAKING SUCH SCREEN

Michael Perander, Diskusvägen 11, S-352 51 Växjö , and Stellan Persson, Förmaksvägen 11, S-352 63 Växjö, both of Sweden

PCT No. PCT/SE87/00446, § 371 Date May 15, 1989, § 102(e) Date May 15, 1989, PCT Pub. No. WO88/02547, PCT Pub. Date Apr. 7, 1988
PCT Filed Oct. 2, 1987, Ser. No. 340,415
Claims priority, application Sweden, Oct. 3, 1986, 8604203
Int. Cl.[5] H04N *5/65*
U.S. Cl. 428—697 3 Claims



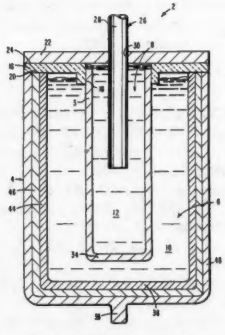
1. A display screen with reduced electrostatic field characterized in that it has applied to the outer side of the display screen a thin film which contains SnO_2 and Sb_2O_3 in a weight ratio of from 99:1 to 91:9 and which is earthed.

4,999,262

MULTILAYER CATHODE CURRENT COLLECTOR/CONTAINER FOR A BATTERY

Lawrence S. Prince, Long Beach, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Apr. 20, 1990, Ser. No. 512,290
Int. Cl.[5] H01M *4/36*
U.S. Cl. 429—104 20 Claims



1. A cathode current collector for use in an electrochemical battery, including:
a first layer, consisting graphite; and,

a second layer, consisting molybdenum, securely bonded to said first layer.

4,999,263

SHEET-SHAPED ELECTRODE, METHOD OR PRODUCING THE SAME, AND SECONDARY BATTERY

Toshiyuki Kabata, Yokohama; Toshiyuki Ohsawa, Kawasaki; Sachiko Yoneyama, Yokohama, and Okitoshi Kimura, Tokyo, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

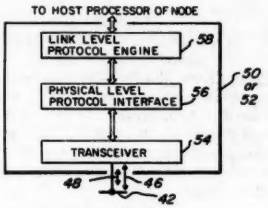
PCT No. PCT/JP88/00373, § 371 Date Dec. 15, 1988, § 102(e) Date Dec. 15, 1988, PCT Pub. No. WO88/08210, PCT Pub. Date Oct. 20, 1988

PCT Filed Apr. 14, 1988, Ser. No. 290,411

Claims priority, application Japan, Apr. 15, 1987, 62-92791; Jul. 6, 1987, 62-168280; Jul. 9, 1987, 62-169689; Oct. 2, 1987, 62-248093; Nov. 11, 1987, 62-283095

Int. Cl.[5] H01M *4/60, 4/70*

U.S. Cl. 429—131 9 Claims



1. A sheet-shaped electrode, comprising:

a polymeric active material; and

a collector, wherein said collector is in the shape of a sheet and has a plurality of penetrating pores of a round shape over the surface thereof and wherein a layer of said polymeric active material is formed on opposing faces of said sheet of said collector.

4,999,264

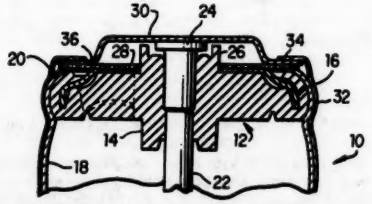
AQUEOUS ELECTROCHEMICAL CELL

Vance R. Shepard, Jr., Hubbardston, Mass., and Michelle Wolf, Overland Park, Kans., assignors to Duracell Inc., Bethel, Conn.

Filed Nov. 24, 1989, Ser. No. 440,954

Int. Cl.[5] H01M *2/08*

U.S. Cl. 429—171 12 Claims



1. An electrochemical cell having a zinc anode, a manganese dioxide cathode, a separator, and an alkaline electrolyte, all in operative association with one another and contained within an open ended cylindrical cell casing, said cell further comprising a plastic seal disposed in the open end of the cell casing; an inwardly directed crimp formed around the upper end of the cell casing; a metallic anode conductor extending substantially through the plastic seal member and into the anode; an outer, metallic cover having a cup-shaped portion, said cover being electrically connected to an external end of the anode conductor and said cover being disposed over the seal; and at least one annular member comprising a gelling agent disposed between the seal and the outer metallic cover.

4,999,265

ALKALINE CELLS CONTAINING FLUORESCENT DYES

Robert B. Dopp, Madison, Wis., assignor to Rayovac Corporation, Madison, Wis.

Filed Jul. 5, 1989, Ser. No. 375,531

Int. Cl.[5] H01M *2/00*

U.S. Cl. 429—198 22 Claims

10. An electrochemical cell comprising an electrolyte composition, said electrolyte composition comprising an alkaline electrolyte mixture suitable for use in an electrochemical cell and a fluorescent dye or compound additive.

4,999,266

PROTECTED COLOR IMAGE ON SUBSTRATE WITH THERMAL ADHESIVE AND ANTIBLOCKING OVERLAYERS

Stephan J. W. Platzer, Califon; Mehmet U. Yener, Rahway, and Stanley F. Wanat, Scotch Plains, all of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Continuation of Ser. No. 142,089, Jan. 7, 1988, abandoned, which is a continuation-in-part of Ser. No. 853,782, Apr. 18, 1986, Pat. No. 4,719,169. This application Dec. 6, 1989, Ser. No. 449,359

Int. Cl.[5] G03C *3/00*

U.S. Cl. 430—14 12 Claims

1. An imaged photographic article having a protected image which consists essentially of

(a) a colored image disposed on a substrate; and

(b) a thin, transparent, colorless, thermoplastic adhesive composition layer directly on the surface of the image, wherein said adhesive layer is substantially non-tacky at room temperature, and comprises one or more thermoplastic polymers or copolymers capable of forming a flexible film and having a Tg of from about 20° C. to about 60° C. and said adhesive layer having been transferred directly to the image when the adhesive layer is first disposed on the release surface of a temporary support and said image and adhesive layer are laminated together under pressure at temperatures of between about 60° C. and about 90° C. and said temporary support is peeled away from the adhesive layer; and

(c) a separate, non-self supporting uppermost antiblocking layer directly on said adhesive layer, said antiblocking layer being transparent, colorless and comprises one or more organic polymers or copolymers having a Tg of above about 60° C., which antiblocking layer does not cohesively block at about 50° C. or less, and wherein said antiblocking layer has a thickness of less than about 10 μm.

4,999,267

PHOTOSENSITIVE MEMBER HAVING PHTHALOCYANINE COMPOUND AND ADDITIVE

Mitsutoshi Sakamoto, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka and Toyo Ink Mfg. Co., Ltd., Tokyo, both of, Japan

Filed Oct. 4, 1989, Ser. No. 417,028

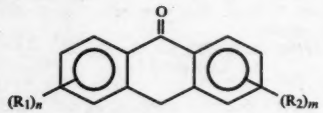
Claims priority, application Japan, Oct. 5, 1988, 63-252621; Oct. 5, 1988, 63-252622; Oct. 5, 1988, 63-252623

Int. Cl.[5] G03G *5/047, 5/09*

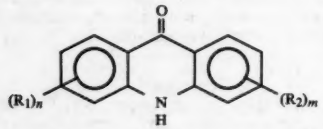
U.S. Cl. 430—58 10 Claims

1. A photosensitive member having a laminated photosensitive layer constituted of a charge generating layer and a charge transporting layer on a electrically conductive substrate, wherein the charge generating layer comprises an unstable crystal type of a phthalocyanine compound as a charge generating material and an additive selected from the group consisting of indoles having a primary amino group, indazoles having a primary amino group, planar monocyclic compounds of five

or six-membered heterocyclic rings with nitrogen or nitrogen plus oxygen or sulfur having a primary amino group, anthrones represented by the general formula [I] below and acridones represented by the general formula [II] below;



[I]



[II]

wherein n and m are an integer of 0–3 respectively; R_1 and R_2 are independently an alkyl group, an alkoxy group, an amino group, a hydroxy group, a halogen atom or a nitro group; when n is 2 or more, each R_1 may be the same or different; when m is 2 or more, each R_2 may be the same or different; wherein said additive is contained at the content of 0.01–10 parts by weight on the basis of one part by weight of the phthalocyanine compound.

4,999,268

FUNCTION SEPARATED ELECTROPHOTOGRAPHIC PHOTORECEPTOR CONTAINING SELENIUM

Fumio Ojima; Kiyokazu Mashimo; Masahiko Hozumi; Taketoshi Hoshizaki, and Kazuyuki Nakamura, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Feb. 6, 1989, Ser. No. 307,562

Claims priority, application Japan, Feb. 10, 1988, 63-27421

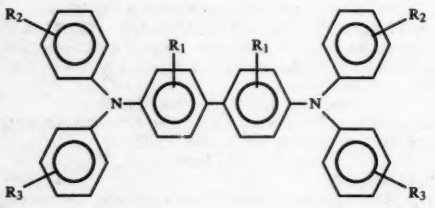
Int. Cl.[5] G03G *5/14*

U.S. Cl. 430—59 **12 Claims**

1. An electrophotographic photoreceptor comprising a light-sensitive layer on an electrically conductive substrate, wherein said light-sensitive layer comprises:

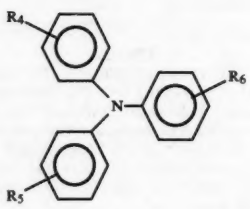
(1) particles of selenium or selenium alloy as the charge generating material; and

(2) at least one compound represented by formula (I),



(I)

wherein R_1 represents a hydrogen atom, an alkyl group or an alkoxyl group; R_2 and R_3, which may be the same or different, represent each a hydrogen atom, a halogen atom, an alkyl group, an alkoxyl group, an alkoxycarbonyl group or a substituted amino group, and at least one compound represented by formula (II),



wherein R_4, R_5 and R_6, which may be the same or different, represent each a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, an alkoxycarbonyl group or a substituted amino group, as the charge transporting materials.

4,999,269

ELECTROPHOTOGRAPHIC PHOTORECEPTOR WITH BISAZO COMPOUND

Kazuhiro Emoto; Kozo Haino; Akira Itoh, and Makoto Okaji, all of Nagaokakyo, Japan, assignors to Mitsubishi Paper Mills, Limited, Tokyo, Japan

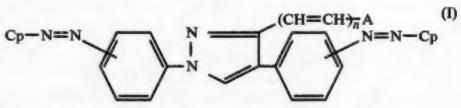
Continuation of Ser. No. 260,140, Oct. 20, 1988, abandoned. This application Jul. 31, 1990, Ser. No. 560,874

Claims priority, application Japan, Feb. 4, 1988, 63-25437; Feb. 8, 1988, 63-28335

Int. Cl.[5] G03G *5/047, 5/06*

U.S. Cl. 430—58 **11 Claims**

1. An electrophotographic photoreceptor which comprises an electroconductive support and, provided thereon, a photosensitive layer containing an azo pigment represented by the following formula (I):



(I)

wherein A is selected from the group consisting of a hydrogen atom, an alkyl group, a phenyl group or a heterocyclic ring group, n is 0 or 1 and Cp is a coupler residue.

3. An electrophotographic photoreceptor according to claim 1 wherein the photosensitive layer comprises a charge generating layer containing the azo pigment as a charge generating material and a charge transfer layer containing a charge transfer material.

4,999,270

PRINTING MEMBER FOR ELECTROSTATIC PHOTOCOPYING

Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Division of Ser. No. 116,337, Nov. 2, 1987, Pat. No. 4,889,783, which is a division of Ser. No. 814,083, Dec. 24, 1985, abandoned, which is a continuation of Ser. No. 502,583, Jun. 9, 1983, abandoned, which is a division of Ser. No. 276,503, Jun. 23, 1981, Pat. No. 4,418,132. This application Dec. 19, 1989, Ser. No. 452,355

Claims priority, application Japan, Jun. 25, 1980, 55-86801

The portion of the term of this patent subsequent to Nov. 23, 2000, has been disclaimed.

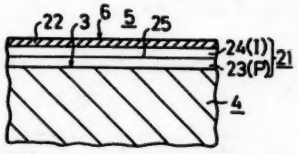
Int. Cl.[5] G03G *5/14*

U.S. Cl. 430—67 **3 Claims**

1. In an electrostatic photocopying machine comprising:

a conductive substrate;

a boron-doped silicon-based layer formed on said conductive substrate;



a non-single-crystal intrinsic silicon-based semiconductor layer formed on said layer; and an insulating layer formed on said intrinsic layer.

4,999,271

PRINTING PLATE PRECURSORS

Terence Etherington, Roundhay; Keith M. Fletcher, Oakwood; Rodney M. Potts, Adel, and John R. Wade, Otley, all of England, assignors to Vickers PLC, London, England

Continuation of Ser. No. 96,893, Sep. 15, 1987, abandoned. This application Jan. 17, 1989, Ser. No. 298,221

Claims priority, application United Kingdom, Sep. 16, 1986, 8622266

Int. Cl.[5] G03F *7/028*

U.S. Cl. 430—284 **11 Claims**

1. A printing plate precursor comprising a substrate coated with a radiation sensitive composition which composition comprises at least one photoinitiator and at least one photopolymerisable compound which is an acrylic or methacrylic ester of a tetra functional polyol having the general formula:

$$C(CH_2O)_4(C_3H_6O)_nH_4$$

wherein the average degree of propoxylation n is from 3 to 6, from 50% to 90% of the available hydroxy groups have been converted to acrylate or methacrylate groups, and the remaining hydroxy groups have been reacted with a di-isocyanate or a polyisocyanate.

4,999,272

ELECTROPHOTOGRAPHIC ANALOG AND DIGITAL IMAGING AND DEVELOPING USING MAGNETIC TONER

Hirohide Tanikawa, Yokohama; Toshiaki Nakahara, Tokyo; Satoshi Yoshida, Kawasaki; Masatsugu Fujiwara, Yokohama, and Kiichiro Sakashita, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 25, 1989, Ser. No. 398,502

Claims priority, application Japan, Aug. 31, 1988, 63-215160

Int. Cl.[5] G03G *13/09*

U.S. Cl. 430—106.6 **18 Claims**

1. An image forming method, comprising:

providing an electrophotographic photosensitive member comprising an organic photoconductor, and a toner-carrying member carrying thereon a magnetic toner disposed opposite to the photosensitive member with a predetermined clearance in a developing region; said photosensitive member comprising at least two species of charge-generating substances and carrying thereon a digital and an analog electrostatic images;

carrying the magnetic toner on the toner-carrying member to the developing region while regulating the magnetic toner so as to provide a thickness smaller than said clearance; said magnetic toner having a particle size distribution such that it comprises 12–60% by number of magnetic toner particles having a particle size of 5 microns or smaller, 1–33% by number of magnetic toner particles having a particle size of 8–12.7 microns, and 2.0% by volume or less of magnetic toner particles having a particle size of 16 microns or larger, and has a volume-average particle size of 4–10 microns; and

developing the electrostatic images with said magnetic toner.

4,999,273

PRESENSITIZED PLATE

Akira Hasegawa, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

Continuation of Ser. No. 264,889, Oct. 31, 1988, abandoned, which is a continuation-in-part of Ser. No. 39,730, Apr. 20, 1987, abandoned. This application Jul. 27, 1990, Ser. No. 560,292

Claims priority, application Japan, Apr. 23, 1986, 61-93533

Int. Cl.[5] G03C *1/72*

U.S. Cl. 430—138 **27 Claims**

1. A positive-working type presensitized plate which consists essentially of a support subjected to a hydrophilizing treatment and having provided thereon a layer which consists essentially of (i) 0.3 to 20 g/m^2 of microcapsules consisting essentially of 40 to 95% by weight, based on total weight of the microcapsules, of an ethylenically unsaturated photopolymerizable monomer and having a lipophilic wall membrane made of at least one member selected from the group consisting of a polyurea, polyurethane, polyethylene, polyamide, polyester, polycarbonate, polyethyleneamine, phenol-formalin resin, melamine resin, vinyl polymer, vinyl copolymer, polyacrylonitrile, polyvinylacetal resin, cellulose acetate, polypropylene and polybutadiene, said lipophilic wall membrane in non-exposed areas having the ability to form a lipophilic uniform film and (ii) 0.05 to 20% by weight, based on the total weight of the microcapsules, of a hydrophilic binder, wherein (1) the microcapsules contain 0.1 to 30% by weight based on the total weight of the photopolymerizable monomer, of a photopolymerization initiator capable of adsorbing light at ultraviolet to visible region and initiating polymerization of the photopolymerizable monomer (2) the particle size of the microcapsules is 0.01 to 30 μ and (3) the microcapsule wall has a contact angle with water of 40 degrees or more and is substantially water insoluble.

4,999,274

POSITIVE TYPE PHOTOSENSITIVE RESINOUS COMPOSITION WITH 1,2 QUINONE DIAZIDE SULFONYL UNIT

Mamoru Seio, Hyogo; Kanji Nishijima, Osaka, and Katsukiyo Ishikawa, Kyoto, all of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

PCT No. PCT/JP88/00094, § 371 Date Oct. 27, 1988, § 102(e) Date Oct. 27, 1988, PCT Pub. No. WO88/05928, PCT Pub. Date Aug. 11, 1988

PCT Filed Feb. 2, 1988, Ser. No. 255,193

Claims priority, application Japan, Feb. 2, 1987, 62-23115

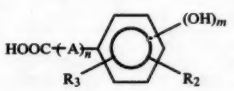
Int. Cl.[5] G03G *1/60*; G03F *7/023*

U.S. Cl. 430—190 **2 Claims**

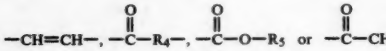
1. A positive type photosensitive resinous composition comprising a photosensitive resin obtained by reacting

(A) at least one polyepoxide compound having an epoxy equivalent of 75 to 1000 selected from the group consisting of a polyvalent alcohol glycidyl ether compound, a polycarboxylic acid glycidyl ester compound, an alicyclic glycidyl compound, a glycidyl amine compound, a heterocyclic glycidyl compound and a bisphenol-A alkylene oxide compound, with

(B) an aromatic or etherocyclic carboxylic acid bearing a phenolic hydroxyl group having the structure



Wherein A is substituted or unsubstituted alkylene or arylene,



R_4 and R_5 are substituted or unsubstituted alkylene or arylene groups; n stands for 0 or 1; m is an integer from 1 to 3; R_2 and R_3 are the same or different, and each represents a hydrogen, halogen, alkyl, alkenyl, nitrile or alkoxyl group and also can be an aromatic, alicyclic or heterocyclic ring formed together with carbon atoms of the benzene ring of the abovesaid carboxylic acid (B); and (C) 1,2-quinonediazido sulfonic acid halide in the proportions by equivalent of the carboxyl groups of (B): an epoxy group of (A)=1:0.8 to 1.2 and a phenolic hydroxyl group of (B): sulfonyl halide group of (C)=1:0.05 to 1.2.

4,999,275

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Yasuo Kasama, and Nobuaki Inoue, both of Kanagawa, Japan, assignors to Fuji Photo Film Co. Ltd., Tokyo, Japan

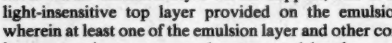
Continuation of Ser. No. 673,642, Nov. 21, 1984, abandoned. This application Oct. 15, 1986, Ser. No. 325,945

Claims priority, application Japan, Nov. 22, 1983, 58-219800

Int. Cl.[5] G03C *1/30, 1/06*

U.S. Cl. 430—264 **6 Claims**

1. A silver halide photographic light-sensitive material comprising a support, at least one negative working light-sensitive silver halide emulsion layer on the support, and at least one light-insensitive top layer provided on the emulsion layer, wherein at least one of the emulsion layer and other constituent layers contains a compound represented by the general formula (I)



(I)

wherein R^1 is a substituted or unsubstituted aryl group, R^2 is a hydrogen atom, a substituted or unsubstituted aryl group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkoxy group, or a substituted or unsubstituted aryloxy group, and G is a carbonyl group, a sulfonyl group, a sulfoxy group, a phosphoryl group, or an N-substituted or unsubstituted imino group and wherein said at least one light-insensitive top layer is hardened so as to have a melting time at least 50 seconds longer than that of the emulsion layer.

4,999,276

SILVER HALIDE PHOTOGRAPHIC MATERIALS

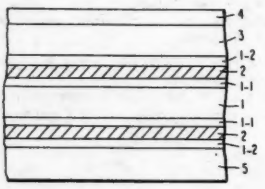
Ken-ichi Kuwabara; Kunio Ishigaki, and Takayuki Inayama, all of Kanagawa, Japan, assignors to Fuji Photo Film Co. Ltd., Tokyo, Japan

Filed Jun. 28, 1989, Ser. No. 372,750

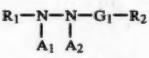
Claims priority, application Japan, Jun. 29, 1988, 63-162146; Jul. 7, 1988, 63-169316

Int. Cl.[5] G03C *1/06*

U.S. Cl. 430—264 **6 Claims**



1. A silver halide photographic material which comprises a support having thereon at least one silver halide emulsion layer and at least one hydrophilic colloid layer wherein at least one of said silver halide emulsion layers and the hydrophilic colloid layers contains a hydrazine derivative represented by formula (I), and also having thereon, as a constitutional layer, at least one electroconductive layer having a surface resistivity of $1\times10^{12}\Omega$ or less in an atmosphere of 25° C. and 25% RH;



(I)

wherein R_1 represents an aliphatic or an aromatic group; R_2 represents a hydrogen atom, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an amino group, a carbamoyl group or an oxycarbonyl group; G_1 represents a carbonyl group, a sulfonyl group, a sulfoxy group,

or an iminomethylene group; A_1 and A_2 are both hydrogen atoms, or one of them represents a hydrogen atom and the other represents a substituted or substituted alkylsulfonyl group, a substituted or unsubstituted arylsulfonyl group, or a substituted or unsubstituted acyl group;

wherein the electroconductive layer contains an electroconductive metal oxide selected from the group consisting of ZnO, TiO_2, SnO_2, Al_2O_3, In_2O_3, SiO_2, MgO, BaO, MoO_3, V_2O_5 or complex oxides thereof; and wherein at least one layer of the material contains a fluorine-containing surfactant.

4,999,277

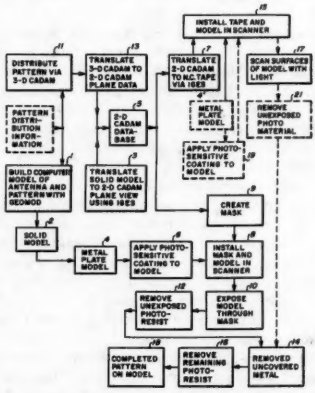
PRODUCTION OF PRECISION PATTERNS ON CURVED SURFACES

Loren B. Haddock; Bruce D. Ballinger, both of Hermosa Beach, and George H. Gelb, Rancho Palos Verdes, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Feb. 22, 1988, Ser. No. 158,803

Int. Cl.[5] G03C *5/00*

U.S. Cl. 430—269 **9 Claims**


INSTALL TAPE AND MODEL IN SCANNER
DISTRIBUTE PATTERN VIA 3-D CADAM
TRANSLATE 3-D CADAM TO 2-D CADAM PLANE DATA
TRANSLATE 2-D CADAM TO N.C. TAPE VIA IGES
SCAN SURFACES OF MODEL WITH LIGHT
PATTERN DISTRIBUTION INFORMATION
2-D CADAM DATA-BASE
METAL PLATE MODEL
REMOVE UNEXPOSED PHOTO MATERIAL
APPLY PHOTO-SENSITIVE COATING TO MODEL
BUILD COMPUTER MODEL OF ANTENNA AND PATTERN WITH GEOMOD
TRANSLATE SOLID MODEL TO 2-D CADAM PLANE VIEW USING IGES
CREATE MASK
SOLID MODEL
METAL PLATE MODEL
APPLY PHOTO-SENSITIVE COATING TO MODEL
INSTALL MASK AND MODEL IN SCANNER
REMOVE UNEXPOSED PHOTO-RESIST
EXPOSE MODEL THROUGH MASK
COMPLETED PATTERN ON MODEL
REMOVE REMAINING PHOTO-RESIST
REMOVED UNCOVERED METAL

1. The method of fabricating a complex pattern on a curved three dimensional surface, said surface being of a first material having a covering layer of a second dissimilar material which includes the steps of: creating a CADAM data base containing a definition of the complex pattern in two dimensional view as representing a two dimensional projected view of said pattern

as applied to the three dimensional surface; coating the surface that is to receive the pattern with a thin covering layer of material, such material having the characteristic of changing its physical properties or state responsive to exposure to a source of collimated light, with said material of said covering layer being different from the material of the body; and scanning a collimated light source along a series of spaced parallel lines in and about a plane spaced from coated portions of the surface of said body, whereby some portions of said body are spaced from said light source at distances different from that by which other portions of said body are spaced from said light source, to expose said coated three dimensional surface underlying said plane to light in the negative image of the pattern defined in said data base.

2. The method as defined in claim 1 wherein the step of coating said surface comprises the step of coating said surface with a photo sensitive material to provide a photosensitive coating thereon.

4,999,278
TRANSMISSIVELY READ OPTICAL RECORDING MEDIUM

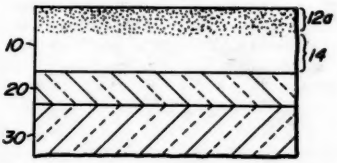
Eric W. Bouldin, Atherton, Calif., assignor to Drexler Technology Corporation, Mountain View, Calif.

Continuation-in-part of Ser. No. 210,527, Jun. 22, 1988, Pat. No. 4,884,260, which is a division of Ser. No. 39,507, Apr. 16, 1987, Pat. No. 4,753,864. This application Jul. 27, 1989, Ser. No. 386,389

The portion of the term of this patent subsequent to Jun. 28, 2005, has been disclaimed.

Int. Cl.[5] G03C *1/035, 1/06*

U.S. Cl. 430—270 **34 Claims**



1. A transmissively read, optical recording medium comprising,

a colloid matrix layer having a surface layer with a uniform thickness, the surface layer formed by irregular spheroidal silver grains having an average diameter less than 0.1 micron and being capable of modification with a light beam into smooth spherical silver grains having substantially the same average diameter as the irregular spheroidal silver grains but with a substantially reduced covering power than the irregular spheroidal silver grains before light beam modification.

23. A spheroidal silver grain of a first type that has an irregular shape with a non-smooth surface, the first type of spheroidal silver grain having a light beam induced capability for modification into a spheroidal silver grain of a second type having a smooth spherical shape with a generally smooth surface, the first and second types of silver grain having a diameter of not greater than 0.1 micron.

4,999,279
PHOTOSENSITIVE RESIN COMPOSITION

Shigeo Takenaka, Ohtsu, Japan, assignor to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Jan. 12, 1989, Ser. No. 296,101

Claims priority, application Japan, Jan. 13, 1988, 63-006567

Int. Cl.[5] G03F *7/031*; G03C *1/735*

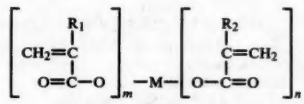
U.S. Cl. 430—781 **5 Claims**

1. A photosensitive resin composition which comprises

a basic nitrogen-containing polyamide (A),

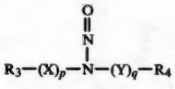
a monomer having a polymerizable unsaturated bond (B),

a compound (C) of the formula (I):



wherein R_1 and R_2 are the same or different and are hydrogen, alkyl, aryl or a derivative thereof; m and n are integers of 0 to 2 and the sum of m and n is 1 to 3; wherein M is an alkaline metal, an alkaline earth metal or a transition metal, and

a compound of N-nitrosoamine compound of the formula (II) or a salt thereof (D) of the formula:



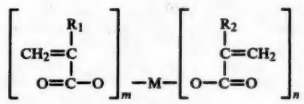
wherein R_3 and R_4 are the same or different and are halogen, hydroxyl, carboxyl, alkyl, cycloalkyl, optionally substituted aryl or acyl group; X and Y are carbonyl or —O—; and p and q are 1 or 0.

5. A method of using a photosensitive composition comprising the steps of (a) image-wise exposing the composition to sufficient radiant energy to cure the composition in exposed areas therein to create a latent image and (b) washing the exposed composition with water to develop the latent image, wherein the photosensitive composition comprises

a basic nitrogen-containing polyamide (A),

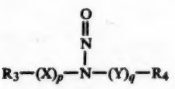
a monomer having a polymerizable unsaturated bond (B),

a compound (C) of the formula (I):



wherein R_1 and R_2 are the same or different and are hydrogen, alkyl, aryl or a derivative thereof; m and n are integers of 0 to 2 and the sum of m and n is 1 to 3; wherein M is an alkaline metal, an alkaline earth metal or a transition metal, and

a compound of N-nitrosamine compound of the formula (II) or a salt thereof (D) of the formula:



wherein R_3 and R_4 are the same or different and are halogen, hydroxyl, carboxyl, alkyl, cycloalkyl, optionally substituted aryl or acyl group; X and Y are carbonyl or —O—; and p and q are 1 or 0.

4,999,280
SPRAY SILYLATION OF PHOTORESIST IMAGES

Hiroyuki Hiraoka, Saratoga, Calif., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 17, 1989, Ser. No. 324,849

Int. Cl.[5] G03F *7/40*

U.S. Cl. 430—330 **9 Claims**

1. A process for making a photoresist image resistant to reactive ion etching, said process comprising the steps of:

i. coating the image with a poly(dimethylsilazane),

ii. heating the coated image, and
iii. rinsing the image with a solvent.

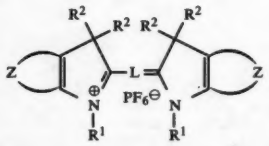
4,999,281

OPTICAL INFORMATION RECORDING MEDIUM

Yoshio Inagaki; Keiichi Adachi, both of Minami-Ashigara, and Masao Yabe, Fujinomiya, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 17, 1988, Ser. No. 233,132
Claims priority, application Japan, Aug. 20, 1987, 62-207175
Int. Cl.[5] G11B *7/24*; G03C *1/73*
U.S. Cl. 430—495 **17 Claims**

1. An optical information recording medium for carrying out recording or readout with laser beams, which comprises a support having carried thereon at least one compound represented by the general formula (I):



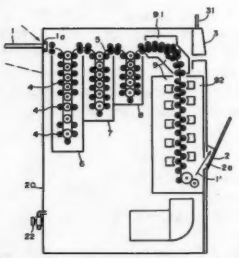
wherein R^1 and R^2 independently represent a substituted or unsubstituted alkyl group, or a substituted or unsubstituted aryl group, Z represents an atomic group necessary for forming a substituted or unsubstituted aromic ring, and L represents a linking group necessary for forming a mono-, di-, tri- or tetracarbocyanine dye.

4,999,282

SILVER HALIDE PHOTOGRAPHIC MATERIAL

Kiyoshi Sato, and Kouji Ono, both of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

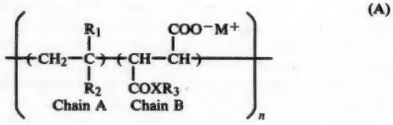
Filed May 17, 1989, Ser. No. 353,295
Claims priority, application Japan, May 18, 1988, 63-121495; Jun. 12, 1988, 63-158644
Int. Cl.[5] G03C *1/05, 1/22*
U.S. Cl. 430—569 **17 Claims**



1. Silver halide photographic material having at least one layer containing a light-sensitive silver halide emulsion that is spectrally sensitized with a sensitizing dye selected from formula (1-a) and formula (1-b) to light having a wavelength of 750 nm and above wherein said silver halide emulsion is prepared by a process which comprises:

(a) generating silver halide grains by adding a solution of a water-soluble silver salt and a solution of a water-soluble halide to a solution containing a protective colloid;

(b) aggregating the generated silver halide grains with either (i) a gelatinous flocculant in which at least 50% of the amino groups in the gelatin molecule is replaced by an acyl, carbamoyl, sulfonyl, thiocarbamoyl, alkyl and/or aryl group, or (ii) a high-molecular weight compound that is composed of chains A and B as represented by formula (A):

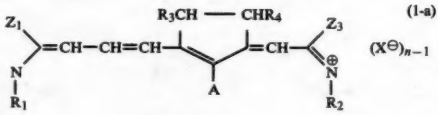


(A)

wherein R_1 and R_2 each represent an aliphatic group; R_3 represents a hydrogen atom, an aliphatic group, an aryl group or an aralkyl group; X is —O— or —NH—; M^+ is a cation; n is a numeral of 10 to 10^4; and the two linkages of chain B are such that either may be bonded to the tertiary carbon atom to which R_1 and R_2 in chain A are attached, together with the protective colloid;

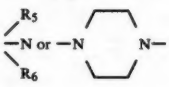
(c) removing the dissolved matter to obtain the silver halide emulsion; and

(d) spectrally sensitizing the silver halide emulsion with a sensitizing dye selected from Formula (1-a) and (1-b)

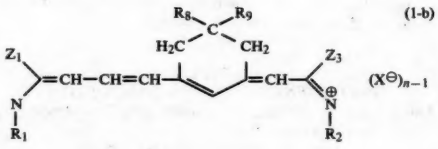


(1-a)

wherein z_1 and z_3 each represent the non-metallic atomic group necessary to form an optionally substituted benzothiazole, benzoxazole, naphthothiazole or naphthoxazole nucleus; R_1 and R_2 each represent a saturated or unsaturated aliphatic group; $X^\ominus$ is an anion; n is 1 or 2; A is



R_3 and R_4 each represent a hydrogen atom, an alkyl group having 1–4 carbon atoms, a halogen atom or an alkoxy group having 1–4 carbon atoms; R_5 and R_6 each represent an alkyl group having 1–12 carbon atoms, an alkoxycarbonylalkyl group, or an optionally substituted aryl group; R_7 is an alkyl group having 1–12 carbon atoms, an aryl group having 6–10 carbon atoms, or an alkoxycarbonyl group with the alkoxy having 1–4 carbon atoms;



(1-b)

wherein R_8 is a hydrogen atom or a methyl group; R_9 is a hydrogen atom, an alkyl group having 1–4 carbon atoms or a monocyclic aryl group; R_1, R_2, Z_1, Z_3, $X^\ominus$ and n each has the same meaning as defined for formula (1-a).

4,999,283

METHOD FOR X AND Y SPERMATOZOA SEPARATION

Panayiotis M. Zavos, and Karl A. Dawson, both of Lexington, Ky., assignors to University of Kentucky Research Foundation, Lexington, Ky.

Continuation of Ser. No. 818,338, Jan. 10, 1986, abandoned. This application Aug. 18, 1989, Ser. No. 396,738

Int. Cl.[5] A01N *1/02;* C12Q *1/00;* C12N *5/00*

U.S. Cl. 435—2 17 Claims

1. The method for separating male and female determining spermatozoa for the purpose of controlling the sex of offspring prior to conception, comprising the steps of:

exposing the spermatozoa in a protein free diluent to an excess concentration of a first antibody that binds male determining spermatozoa;

suspending said exposed spermatozoa together with a conjugate of a second antibody that binds exclusively to said first antibody and an immunoabsorbent substrate in a protein free diluent to form a conjugate/spermatozoa preparation; and

recovering the female determining spermatozoa from the conjugate/spermatozoa preparation while said male determining spermatozoa are bound to said immunoabsorbent substrate.

4,999,284

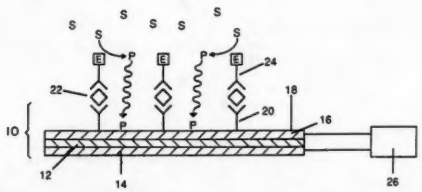
ENZYMATICALLY AMPLIFIED PIEZOELECTRIC SPECIFIC BINDING ASSAY

Michael D. Ward, Newark, and Richard C. Ebersole, Wilmington, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 6, 1988, Ser. No. 178,366

Int. Cl.[5] C12Q *1/00;* G01N *33/53;* C12N *13/00*

U.S. Cl. 435—4 28 Claims



1. In a process for detecting an analyte suspected of being present in a liquid sample, which process comprises reacting the sample with a quartz crystal microbalance (QCM) having an analyte capture reagent bound to a surface thereof thereby binding the analyte to the QCM by the analyte capture reagent, the improvement comprising reacting the bound analyte with (1) a conjugate comprising an enzyme and either an anti-analyte reagent or the analyte, and (2) a substrate which is catalyzed by the enzyme to form a product which accumulates on or reacts with the QCM surface to induce a mass change, thereby leading to a resonant frequency change of the QCM.

4,999,285

CHROMATOGRAPHIC CASSETTE

S. Nicholas Stiso, San Jose, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Nov. 15, 1984, Ser. No. 672,568

Int. Cl.[5] G01N *33/53, 33/558, 30/90, 30/02*

U.S. Cl. 435—7.9 30 Claims

1. A chromatographic device, comprising in combination

(a) a housing having front, rear, and inner walls, and top and bottom ends,

(b) a strip of bibulous material non-removably confined in said housing,

(c) means attached to the inner walls of said housing for supportively confining said strip in said housing and constructed so as to keep (1) the front and back of said strip free from contact with the inner walls of said housing and (2) the capillary action of said strip substantially unchanged,

(d) means at the bottom end of said housing for enabling contact of a portion of said strip with a liquid medium, and

(e) means in the front wall of said housing for visually observing said strip.

4,999,286

SULFATE REDUCING BACTERIA DETERMINATION AND CONTROL

Len J. Gawel, Ponca City, Okla.; Thomas Ng, Portola Valley, Calif.; James M. Odom, and Richard C. Ebersole, both of Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 23, 1986, Ser. No. 946,547

Int. Cl.[5] G01N *33/50, 33/53;* C12Q *1/68*

U.S. Cl. 435—7.32 8 Claims

5. A method for detecting the presence of sulfate-reducing bacteria in a sample comprising:

(a) preparing a lysate of said sample to release into said lysate adenosine 5'-phosphosulfate reductase (APS reductase) contained in said sulfate-reducing bacteria,

(b) contacting at least a portion of the lysate with a first antibody specific for the APS reductase to form a first complex, and

(c) detecting the first complex as an indication of the presence of sulfate-reducing bacteria.

4,999,287

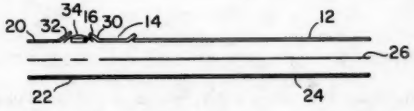
DIRECT MEASURING ASSAY STRIP AND METHOD OF USE THEREOF

Michael P. Allen, Sunnyvale, and Robert B. Shibuya, Los Altos, both of Calif., assignors to Chemtrak Corporation, Sunnyvale, Calif.

Filed May 19, 1988, Ser. No. 195,881

Int. Cl.[5] C12Q *1/28, 1/54, 1/60;* G01N *21/78*

U.S. Cl. 435—11 21 Claims



1. A dipstick measuring device comprising:

in a direction of eluent flow,

a first bibulous bridging strip extending from an immersion end of said device to a sample pad site;

a sample pad at said sample pad site;

a second bibulous bridging strip extending from said sample pad site to a measurement region fluid receiving site; and

an extended bibulous measurement strip in fluid communication with said second bridging strip and impregnated with a first member of a signal producing system, which upon

reaction with a second member of said signal producing system produces a detectable signal defining a boundary on said measurement strip; and

a removable inert protective barrier separating said sample pad from fluid communication with said first and second bridging strips and bringing said sample paid into fluid communication with said first and second bridging strips when removed.

4,999,288

TEST COMPOSITION AND METHOD FOR THE DETERMINATION OF ANILIDES

Aurora F. deCastro, Union, Mich.; Surendra K. Gupta, Elkhart, and Steven M. Shantz, Goshen, both of Ind., assignors to GDS Technology, Inc., Elkhart, Ind.

Filed Oct. 28, 1987, Ser. No. 116,169

Int. Cl.[5] C12Q *1/34, 1/28;* C12N *9/96*

U.S. Cl. 435—18 **9 Claims**

1. A test composition for detecting anilides comprising an arylacylamidase enzyme E. C. 3.5.1.13, a compound containing aromatic groups which is capable of developing a colored compound in the presence of aniline or an aniline derivative and an oxidant/catalyst selected from the group consisting of periodate persulfate and peroxidase compounds in an amount sufficient for accelerating development of said color compound.

4,999,289

LIPASE, ITS PRODUCTION AND USE FOR ASSAY OF TRIGLYCERIDES

Tetsunori Akiba, Kani; Shotaro Yamaguchi; Satoru Suzuki, both of Aichi; Kimiyasu Isobe, Konan, and Kuniyoshi Matsunaga, Ichinomiya, all of Japan, assignors to Amano Pharmaceutical Co. Ltd.,, Aichi, Japan

Filed Apr. 6, 1987, Ser. No. 34,452

Claims priority, application Japan, Apr. 10, 1986, 61-082991; Apr. 10, 1986, 61-082992

Int. Cl.[5] C12Q *1/44;* C12N *9/20*

U.S. Cl. 435—19 **9 Claims**

6. Method of assaying triglycerides which comprises reacting such triglyceride with a lipase isolated from *Penicillium cyclopium* and assaying glycerol liberated from the triglyceride, the lipase being characterized by the following properties:

(1) Hydrolyzes triglycerides of fatty acids having 4–18 carbon atoms;

(2) Hydrolysis of such triglycerides with such lipase produces at least 5 moles of glycerol per 100 moles of fatty acid;

(3) Optimal pH range for said hydrolysis 5–7;

(4) Stable in the pH range of 4.5–6;

(5) Optimal temperature range for activity 35°–40° C.;

(6) Thermal stability up to about 35° C.;

(7) Activated by surface-active agents, but not substantially inhibited by such surface-active agents in concentration up to 5%;

(8) Molecular weight about 100,000 to 120,000;

(9) Isoelectric point about pH 3.84.

4,999,290

DETECTION OF GENOMIC ABNORMALITIES WITH UNIQUE ABERRANT GENE TRANSCRIPTS

Ming-Sheng Lee, Houston, Tex., assignor to The Board of Regents, The University of Texas System, Austin, Tex.

Filed Mar. 31, 1988, Ser. No. 175,833

Int. Cl.[5] C12Q *1/68;* C07H *15/12;* C12N *15/00*

U.S. Cl. 435—6 **27 Claims**

1. A method for detecting the unique aberrant gene transcripts of a targeted cellular genomic abnormality in a tissue sample, the method comprising the steps of:

preparing m-RNA or total cellular RNA from the tissue sample;

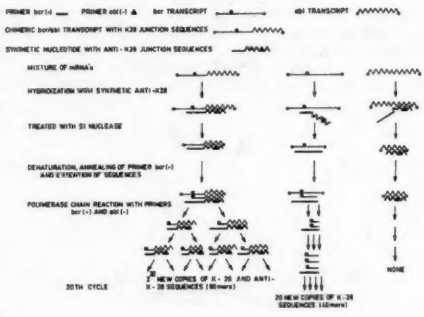
mixing the m-RNA or total cellular RNA with at least one antisense synthetic DNA oligonucleotide complementary to the unique RNA sequence of the targeted cellular genomic abnormality, said mixing facilitating formation of double stranded DNA-RNA heteroduplexes when DNA and RNA complementary strands are present;

adding a control DNA oligomer characterized as having a base sequence and size different from that of the antisense synthetic DNA oligonucleotide;

treating the mixture with a single strand-specific nuclease whereby single stranded RNA and single stranded DNA but not double stranded DNA-RNA heteroduplexes are hydrolyzed;

deactivating the nuclease and denaturing unhydrolyzed heteroduplexes to form a mixture of single stranded DNA and RNA;

subjecting the single stranded DNA of the denatured mixture to at least about 20 rounds of polymerase chain reaction with at least one first primer complementary to a portion of the 3′ end of the antisense synthetic DNA oligonucleotide, at least one second primer identical to a


PRIMER bcr(+)
PRIMER abl(-)
bcr TRANSCRIPT
abl TRANSCRIPT
CHIMERIC bcr/abl TRANSCRIPT WITH K28 JUNCTION SEQUENCES
SYNTHETIC NUCLEOTIDE WITH ANTI-K28 JUNCTION SEQUENCES
MIXTURE OF mRNA's
HYBRIDIZATION WITH SYNTHETIC ANTI-K28
TREATED WITH S1 NUCLEASE
DENATURATION, ANNEALING OF PRIMER bcr(+) AND EXTENTION OF SEQUENCES
POLYMERASE CHAIN REACTION WITH PRIMERS bcr(+) AND abl(-)
30TH CYCLE
NONE

portion of the 5′ end of the antisense synthetic DNA oligonucleotide, and at least two control primers, a first control primer being complementary to at least a portion of one end of the 3′ end and a second control primer being complementary to at least a portion of the 5′ end of the control DNA oligomer, said polymerase chain reaction resulting in amplimers of unhydrolyzed synthetic DNA oligonucleotide and DNA oligonucleotides complementary thereto; and

detecting the presence of amplimers comprising nucleotide sequences characteristic of the unique aberrant gene transcripts of the targeted cellular genomic abnormality or the complementary synthetic DNA oligonucleotide, said presence being detected only where complementary m-RNA from the tissue sample has protected the synthetic antisense DNA oligonucleotide from nuclease digestion and wherein detection of amplimers is quantitatively related to aberrant gene transcripts, provided that amplified control DNA oligomer is absent, as an indication of complete single-strand nuclease hydrolysis.

4,999,291

PRODUCTION OF HUMAN PLURIPOTENT GRANULOCYTE COLONY-STIMULATING FACTOR

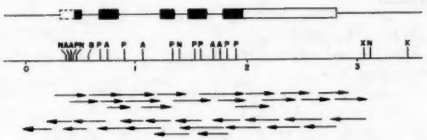
Lawrence M. Souza, Thousand Oaks, Calif., assignor to Amgen Inc., Thousand Oaks, Calif.

Continuation of Ser. No. 835,548, Mar. 3, 1986, Pat. No. 4,810,643, which is a continuation-in-part of Ser. No. 768,959, Aug. 23, 1985, abandoned. This application Mar. 6, 1989, Ser. No. 319,919

The portion of the term of this patent subsequent to Mar. 7, 2006, has been disclaimed.

Int. Cl.[5] C12P *21/06, 21/02, 21/04, 12/34;* C12N *15/00;* C12H *15/12;* C12K *3/00*

U.S. Cl. 435—69.1 5 Claims



1. A purified and isolated DNA sequence consisting essentially of a DNA sequence encoding human pluripotent granulocyte colony-stimulating factor.

4,999,292

BACTERIA THAT METABOLIZE PHENYLACETATE THROUGH MANDELATE

Steven D. Geusz, 2712 Terrapin Rd., Silver Spring, Md. 20906, and David M. Anderson, 13509 Bailey Dr., Rockville, Md. 20850

Filed Dec. 31, 1987, Ser. No. 140,108

Int. Cl.[5] C12R *1/38;* C12P *7/44;* C12N *15/00*

U.S. Cl. 435—172.1 12 Claims

1. A biologically pure microbial culture consisting essentially of bacterial cells that can metabolize phenylacetate through a mandelate intermediate.

4,999,293

METHOD FOR PRODUCING THE HHAI RESTRICTION ENDONUCLEASE AND METHYLASE

Janet M. Barsomian, Georgetown, and Geoffrey G. Wilson, Boxford, both of Mass., assignors to New England Biolabs, Inc., Beverly, Mass.

Filed Dec. 17, 1987, Ser. No. 134,237

Int. Cl.[5] C12N *15/52, 9/22, 1/21*

U.S. Cl. 435—172.3 10 Claims

1. Isolated DNA coding for the HhaI restriction endonuclease, wherein the isolated DNA is obtainable from the vector pJB139RM 4-2.

4,999,294

METHOD FOR PRODUCING THE FOKI RESTRICTION ENDONUCLEASE AND METHYLASE

Mary E. C. Looney, Beverly, and Geoffrey G. Wilson, Boxford, both of Mass., assignors to New England Biolabs, Inc., Beverly, Mass.

Filed Dec. 17, 1987, Ser. No. 134,236

Int. Cl.[5] C12N *15/52, 9/22, 1/21*

U.S. Cl. 435—172.3 10 Claims

1. Isolated DNA coding for the FokI restriction endonuclease, wherein the isolated DNA is obtainable from the vector pML109RM119-1.

4,999,295

BIOCATALYST ENTRAPPED IN A SILK FIBROIN MEMBRANE

Tetsuro Asakura; Makoto Demura, both of Koganei, and Takeshi Kuroo, Tokyo, all of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 1, 1988, Ser. No. 176,687

Claims priority, application Japan, May 8, 1987, 62-110681; Oct. 2, 1987, 62-248215; Mar. 11, 1988, 63-57941

Int. Cl.[5] C12N *11/02, 11/04;* C12Q *1/00;* G01N *27/26*

U.S. Cl. 435—177 12 Claims

1. A method of manufacturing a silk fibroin membrane containing an entrapped biocatalyst comprising the steps of:

(a) mixing a given amount of a biocatalyst solution with a silk fibroin solution to form a mixed solution;

(b) forming a silk fibroin membrane containing the biocatalyst by casting the mixed solution on a substrate followed by drying; and

(c) mechanicallly treating said silk fibroin membrane containing the biocatalyst in an atmosphere held at a given temperature and humidity to form the membrane into β-form and to structurally stabilize said membrane whereby said silk fibroin membrane containing an entrapped biocatalyst is formed.

4,999,296

THYMIDINE KINASE NEGATIVE INSERTION MUTANTS OF PSEUDORABIES VIRUS AND METHODS FOR THE PRODUCTION OF SAME

Malon Kit, and Saul Kit, both of Houston, Tex., assignors to NovaGene, Inc. and Baylor College of Medicine, both of Houston, Tex.

Filed Apr. 29, 1986, Ser. No. 857,703

The portion of the term of this patent subsequent to Apr. 30, 2002, has been disclaimed.

Int. Cl.[5] C12P *21/00;* C12N *15/00, 7/00*

U.S. Cl. 435—235.1 14 Claims

1. A pseudorabies virus which fails to produce any functional thymidine kinase as a result of an insertion in the tk gene.

4,999,297

CULTURE OF CELLS

Norihiko Minoura; Seiichi Aiba, and Yukihiko Fujiwara, all of Ibaraki, Japan, assignors to Director-General of Agency of Industrial Science and Technology, Japan

Filed May 30, 1986, Ser. No. 868,538

Int. Cl.[5] C12N *5/00, 11/08*

U.S. Cl. 435—240.23 1 Claim

1. A method for culturing animal cells for multiplication comprising culturing animal cells on a cell adherent polymethionine surface in a culture medium.

4,999,298

HOLLOW FIBER BIOREACTOR CULTURE SYSTEM AND METHOD

Richard A. Wolfe, Ellisville, Mo.; Aaron H. Heifetz, Columbia; James A. Braatz, Beltsville, both of Md., and David M. Donofrio, Rockport, Mass., assignors to W. R. Grace & Co.-Conn., Lexington, Mass.

Filed Apr. 27, 1988, Ser. No. 186,609

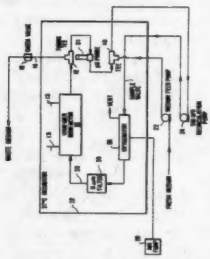
Int. Cl.[5] C12N *5/00, 3/06*

U.S. Cl. 435—240.242 16 Claims

1. A method of culturing cells comprising:

placing cells within the shell side of a hollow fiber membrane cartridge, said cartridge having an inlet end and an outlet end, said cartridge being oriented with its longitudi-

nal axis at 45°–60° with respect to the horizontal, said outlet end being raised above the inlet end; and



continuously circulating a liquid medium containing nutrients through the tube side of said cartridge.

4,999,299

PROPAGATION PROCESS EMPLOYING AGAROSE MEDIUM

Raymond D. Shillito, Rheinfelden; Jerzy Paszkowski, Riehen, and Ingo Potrykus, Magden, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 53,582, May 18, 1987, abandoned, which is a continuation of Ser. No. 801,375, Nov. 22, 1985, abandoned, which is a continuation of Ser. No. 601,876, Apr. 19, 1984, abandoned. This application Jun. 3, 1988, Ser. No. 205,025

Claims priority, application Switzerland, Apr. 29, 1983, 2317/83

Int. Cl.[5] C12N *5/04*

U.S. Cl. 435—240.47 **14 Claims**

1. A process for culturing plant cell aggregates to form calli or plantlets which comprises:

(a) uniformly plating isolated protoplasts in a solidified culture medium, the solidifying component of which is agarose in the absence of agaropectin,

(b) incubating segments of the solidified culture medium, which segments contain the protoplasts, in a liquid nutrient solution until the protoplasts form plant cell aggregates, and

(c) culturing the plant cell aggregates under conditions sufficient for the formation of calli or plantlets until the plant cell aggregates have reached a callus or plantlet stage.

4,999,300

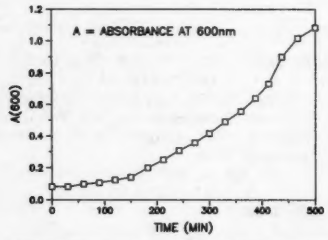
BACTERIAL DEGRADATION OF 4-CHLOROBIPHENYL

Marlene R. Barton, St. Louis Park, Minn., assignor to Regents of the University of Minnesota, Minneapolis, Minn.

Filed Mar. 28, 1988, Ser. No. 173,992

Int. Cl.[5] C12N *1/22, 1/20;* C02F *3/00*

U.S. Cl. 435—252.34 **1 Claim**



1. A biologically pure culture of Pseudomonas MB86 having the identifying characteristics of ATCC 53728, and mutants which are capable of utilizing 4-chlorobiphenyl as a sole carbon and energy source and degrading 4-chlorobiphenyl to chloroacetophenone and other metabolites.

4,999,301

CULTURE AND PRESERVATION OF MICROORGANISMS WITHIN A CONCENTRATED MEDIUM

David G. Bryan-Jones, Stirling, Scotland, assignor to 501 United Distillers plc, Edinburgh, United Kingdom

PCT No. PCT/GB87/00926, § 371 Date Sep. 27, 1988, § 102(e) Date Sep. 27, 1988, PCT Pub. No. WO88/05076, PCT Pub. Date Jul. 14, 1988

PCT Filed Dec. 30, 1987, Ser. No. 250,620

Claims priority, application United Kingdom, Jan. 8, 1987, 8700354

Int. Cl.[5] C12N *1/20, 1/04, 1/00*

U.S. Cl. 435—252.5 **16 Claims**

1. A method of providing bacteria for industrial use, comprising the step of:

combining bacteria with a growth medium capable of delaying onset of the death phase of the growth cycle of said bacteria, wherein said growth medium comprises from about 10% to about 30% solids, and said bacteria are selected from the group comprising *Lactobacillus plantarum* and *Bacillus subtilus;* and

diluting said growth medium containing said bacteria to increase the number of said bacteria.

4,999,302

BIOLOGICAL CONTACT GAS SCRUBBER FOR WASTE GAS PURIFICATION

Brett D. Kahler, 54 Carberry Crescent, Brampton, Ontario, and Matthew P. McKim, 1215 8th Line, Oakville, Ontario, both of Canada

Filed May 28, 1985, Ser. No. 737,878

Claims priority, application United Kingdom, May 30, 1984, 8413751

Int. Cl.[5] C12S *5/00;* C12M *1/10*

U.S. Cl. 435—266 **9 Claims**

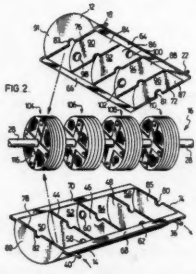


FIG 2.

1. A process for removing one or more pollutants from a waste gas stream comprising in a rotary biocontactor a biomass capable of assimilating said pollutants and producing metabolites by contacting said waste gas stream with said biomass, said biocontactor having a plurality of serially arranged subchambers which are serially in fluid communication above said biomass, each such sub-chamber enclosing a plurality of discs mounted for rotation about a common axis, said biomass being cultured in a bottom portion of said biocontactor in each of said sub-chambers and rotating said discs through said biomass whereby said biomass grows on said discs, introducing to a first of said serially arranged sub-chambers said waste gas stream and passing said waste gas stream through said subchambers above said biomass and over exposed portions of said rotating discs having said biomass growing thereon, removing said pollutants from said waste gas stream by said biomass on said exposed portions of said discs absorbing said pollutants,

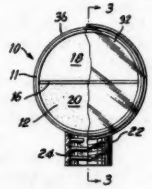
assimilating said pollutants and producing harmless metabolites, exhausting from a last of said sub-chambers said gas stream with a substantial percentage of pollutants removed therefrom and containing any gaseous metabolites at a location in said chamber downstream of where said waste gas is introduced to said chamber, said biomass comprising various microorganism species, the growth of individual species of said various microorganism species is dependent on the concentration of said one or more pollutants in said waste gas stream, the population distribution of said individual species changing from sub-chamber to sub-chamber as determined by concentration of said one or more pollutants decreasing as said gas stream is circulated towards said exhaust location of said chamber.

4,999,303

MULTIPLATE SUBCULTURE SOLID MEDIA DEVICES

Thomas Jaeger, Wayne, and Raymond T. Wasek, Jamesburg, both of N.J., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Dec. 22, 1988, Ser. No. 288,548
Int. Cl.[5] C12N *1/00*; C12Q *1/00*
U.S. Cl. 435—300 **8 Claims**



5. An assembly for culturing microorganisms, characterized by

(a) a liquid culture medium bottle;
(b) said bottle having a closed end and an open end;
(c) a neck on said bottle adjacent the open end;
(d) external threads on said neck; and
(e) a device for connection to said external threads, said device comprising
(1) an elongated body defining a solid growth medium chamber;
(2) a solid wall forming one end of said elongated body;
(3) a plurality of solid medium plates positioned on said solid wall;
(4) a opening forming the end of said elongated body opposite said solid wall;
(5) a transparent cap for said open end;
(6) cooperating connecting means on said open end of said elongated body and said transparent cap for holding said cap in sealing engagement with said open end of said elongated body;
(7) an extension extending integrally from said elongated body between said solid wall and said open end thereof;
(8) a bore extending through said extension and in flow communication with said chamber;
(9) internal screw threads in said extension for connection to the external threads on the said neck of said liquid culture bottle.

4,999,304

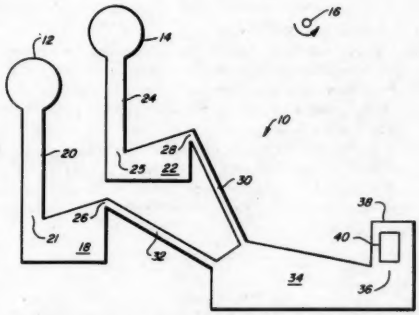
DYNAMIC BRAKING CENTRIFUGE

Steven Robertson, Elkhart, Ind., assignor to Miles Inc., Elkhart, Ind.

Filed Dec. 28, 1987, Ser. No. 138,096
Int. Cl.[5] G01N *1/10, 9/30*
U.S. Cl. 436—45 **1 Claim**

1. An assembly for separately and simultaneously delivering and then mixing multiple fluids, comprising:

a rotating member having an axis of rotation;
means for rotating said rotating member about said axis of rotation and periodically varying the speed of said rotating member;
said rotating member including a first compartment for containment of a first fluid and a separation chamber which is in communication with said first compartment by means of a first passage, wherein said first passage is in preselected alignment relative to said axis of rotation to allow movement of said first fluid along said first passage from said first compartment to said separation chamber under the influence of centrifugal force;
said rotating member also including a first measuring passage in communication with said separation chamber, said first measuring passage aligned relative to said axis of rotation to prevent the flow of said first fluid into the first measuring passage under the influence of centrifugal force but capable of allowing the flow a selected portion of a third fluid obtained from said first fluid in said separation chamber into said first measuring passage upon the influence of a breaking force applied to said rotating member;
said rotating member additionally including a second compartment for containment of a second fluid and a holding chamber which is in communication with said second compartment by means of a second passage, wherein said second passage is in preselected alignment relative to said



axis of rotation to allow movement of said second fluid along said second passage from said second compartment to said holding chamber under the influence of centrifugal force;
said rotating member also including a second measuring passage in communication with said holding chamber, said second measuring passage aligned relative to said axis of rotation to prevent the flow of said second fluid into the second measuring passage under the influence of centrifugal force but capable of allowing the flow of a selected portion of said second fluid into said second measuring passage under the influence of a breaking force applied to said rotating member;
said rotating member also including a mixing chamber, said mixing chamber having a first inlet in communication with said first measuring passage and a second inlet in communication with said second passage, wherein upon rotation of said rotating member at least a portion of said second and third fluids flow into said mixing chamber from the respective second and first measuring passages; and
said rotating member further including a reagent chamber and an inlet in said reagent chamber, said inlet in said reagent chamber being in communication with said mixing chamber, wherein the mixture resulting from the mixing chamber is introduced into said reagent chamber through said reagent chamber inlet.

4,999,305

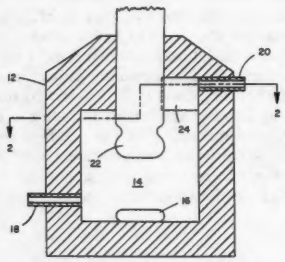
APPARATUS FOR TITRATION FLOW INJECTION ANALYSIS

Duane K. Wolcott, 3406 Morning Glory, Baton Rouge, La. 70808; Ernest D. Graves, Jr., 329 Daventry Dr., Baton Rouge, La. 70810, and David G. Hunt, 7525 Don Budge Ave., Baton Rouge, La. 70808

Continuation of Ser. No. 254,502, Oct. 6, 1988, abandoned, which is a continuation of Ser. No. 932,811, Nov. 19, 1986, Pat. No. 4,798,803, which is a continuation-in-part of Ser. No. 512,797, Jul. 11, 1983, abandoned, which is a continuation-in-part of Ser. No. 753,750, Jul. 10, 1985, abandoned. This application Apr. 19, 1990, Ser. No. 511,875

Int. Cl.[5] G01N *35/08*

U.S. Cl. 436—52 **5 Claims**



1. A mixing cell comprising:

(a) a body defining a chamber having a means for introduction of solution to said chamber and a means for exciting of solution from said chamber where introduction of said solution takes place in the chamber at a lower level than exit of said solution;

(b) a sensing means positioned to be in contact with said solution in said chamber;

(c) a modified Spinfin TM type stirrer positioned in said chamber, said stirrer modified by removal of top fins and addition of side slots.

4,999,306

COMPOSITION, APPARATUS AND METHOD FOR SENSING IONIC COMPONENTS

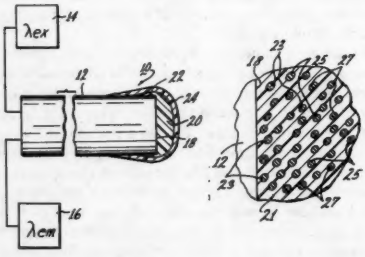
Masao Yafuso, El Toro, and Henry K. Hui, Laguna Niguel, both of Calif., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Continuation-in-part of Ser. No. 917,913, Oct. 10, 1986, Pat. No. 4,798,738. This application Apr. 28, 1988, Ser. No. 188,414

Claims priority, application European Pat. Off., Oct. 7, 1987, 87308884.3

Int. Cl.[5] G01N *21/64*

U.S. Cl. 436—68 **49 Claims**



1. A composition of matter useful for sensing the concentration of an ionic component in a medium, comprising:

a matrix material having a cationic or anionic charge therewithin; and

a sensing component chemically bonded to said matrix material and being effective to provide a signal in response to the presence of said ionic component in said medium;

wherein said matrix material has sufficient cationic or anionic charge distributed within said matrix material such that the apparent ionic concentration sensed by said sensing component within said matrix material is higher or lower than the actual ionic concentration in said medium.

15. An apparatus for measuring the concentration of an ionic component in a medium, comprising:

sensor means including a matrix material having a cationic or anionic charge therewithin, and a sensing component chemically bonded to said matrix material and being effective to provide a signal in response to the presence of said ionic component in said medium, wherein said matrix material has sufficient cationic or anionic charge distributed within said matrix material such that the apparent ionic concentration sensed by said sensing component within said matrix material is higher or lower than the actual ionic concentration in said medium; and

signal means capable of transmitting said signal from said sensing component.

32. A method for sensing the concentration of an ionic component in a medium, comprising:

contacting said medium with a composition comprising:

a matrix material having a cationic or anionic charge therewithin; and

a sensing component chemically bonded to said matrix material and being effective to provide a signal in response to the presence of said ionic component in said medium;

wherein said matrix material has sufficient cationic or anionic charge distributed within said matrix material such that the apparent ionic concentration sensed by said sensing component within said matrix material is higher or lower than the actual ionic concentration in said medium; and

analyzing said signal to determine the concentration of said ionic component in said medium.

4,999,307

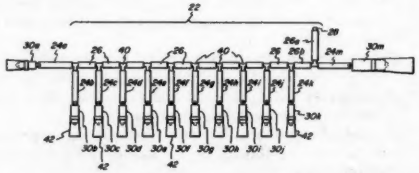
APPARATUS AND METHOD FOR PERIODIC ASEPTIC WITHDRAWAL OF LIQUID SAMPLES FROM A STERILE LIQUID SOURCE

Robert V. Oakley, Lafayette, Calif., assignor to Baxter International Inc., Deerfield, Ill.

Filed Feb. 13, 1989, Ser. No. 310,539

Int. Cl.[5] C12M *1/34, 3/00, 3/02*; G01N *1/10*

U.S. Cl. 436—180 **2 Claims**



1. A liquid sampling device for periodic removal of sample quantities of a sterile source liquid in a manner which reduces risk of introduction of contaminants to the source material, comprising a length of sterilizable primary liquid conduit tube, one end of which is closed to prevent escape of liquid therefrom and one end of which is adapted for liquid communication with a sterilized flow line through which said sterile source liquid flows or is arranged to flow; and, emanating from said sterilizable primary liquid conduit tube at pre-selected areas along its length, a plurality of separate sterilizable sample conduit tubes, each sample conduit tube being in liquid com-

munication with said primary liquid conduit tube through one end of said sample conduit tube, and the other, exit end of said sample conduit tube being adapted to have a sample quantity of sterile source liquid aseptically withdrawn therethrough, by way of said primary liquid conduit tube and sample conduit tube, at least some of said exit ends of said sample conduit tubes being sealably affixed to and in liquid communication with the open sampling end of a sterilizable syringe comprised of a hollow barrel section in liquid communication with said open sampling end of said syringe and having an open end remote from said sampling end of said syringe, and a plunger, arranged in said remote end of said hollow barrel section and movable within said hollow barrel section, for enabling a predetermined quantity of sterile liquid sample to be collected in said hollow barrel section through said sample conduit tube, and wherein at least the portion of said syringe comprised of said plunger and said remote end of said hollow barrel section is enclosed within a flexible bag through which manipulation of said syringe plunger for sample withdrawal can occur without opening of the bag, the arrangement of said sample conduit tubes and primary liquid conduit tube being such as to permit one or more sample conduit tubes, after withdrawal of sample therethrough, to be isolated from the device while maintaining both liquid communication between the primary liquid conduit tube and the remaining sample conduit tubes, and end closure of the primary liquid conduit tube.

4,999,308

METHOD OF MAKING THIN FILM SOLAR CELL ARRAY

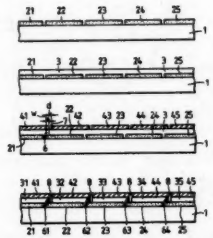
Masaharu Nishiura, and Katsumi Yamada, both of Kanagawa, Japan, assignors to Fuji Electric Co., Ltd., Kanagawa, Japan

Division of Ser. No. 268,904, Nov. 8, 1988. This application Oct. 17, 1989, Ser. No. 422,608

Claims priority, application Japan, Nov. 9, 1987, 62-282801; Dec. 22, 1987, 62-326232; Dec. 28, 1987, 62-332372

Int. Cl.[5] H01L *31/20*

U.S. Cl. 437—4 **2 Claims**



1. A method of producing a thin film solar cell, comprising the steps of:

forming a transparent electrically conductive film on a transparent insulating substrate;

forming said transparent electrically conductive film into a pattern of transparent electrodes;

forming an a-Si layer having a p-i-n junction structure on said transparent insulating substrate through said transparent electrodes;

coating and hardening a plurality of metal electrode patterns on said a-Si layer by a printing method; and

focussing and applying a laser light beam on the overlapping portions where said metal electrodes overlap with said transparent electrodes thereby to remove said a-Si layer at the lower portions of spaces between said metal electrode patterns and to crystallize said a-Si layer at said overlapping portions, which contact the removed portions.

4,999,309

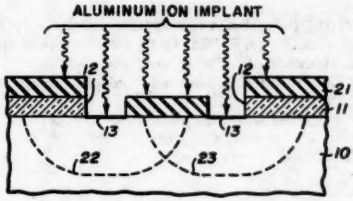
ALUMINUM-IMPLANT LEAKAGE REDUCTION

Matthew S. Buynoski, Palo Alto, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jul. 12, 1990, Ser. No. 553,218

Int. Cl.[5] H01L *21/04*

U.S. Cl. 437—15 **7 Claims**



1. In a process for forming a PN junction device, which is to be created in a silicon monolithic integrated circuit in which aluminum is ion implanted and diffused to a substantial depth, the steps comprising:

forming an ion implant mask over said silicon in the region where a PN junction device is to be formed;

forming an opening in said mask surrounding said region where said device is to be formed;

ion implanting aluminum into said silicon wherein said mask prevents ion implantation except in those areas where said opening exists;

diffusing said implanted aluminum in high temperature to drive said aluminum to a substantial depth in said silicon wherein said aluminum diffuses laterally underneath said mask that exist over said region where said device is to be formed; and

forming a relatively shallow and heavily doped N type region in said region where said PN junction device is to be formed.

4,999,310

METHOD OF MAKING AN LED ARRAY

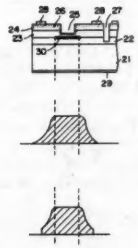
Ki-Joon Kim, Seoul, Rep. of Korea, assignor to SamSung Electronics Co., Ltd., Sywon, Rep. of Korea

Filed Aug. 29, 1989, Ser. No. 399,954

Claims priority, application Rep. of Korea, Dec. 17, 1988, 1988-16845

Int. Cl.[5] H01L *33/00*

U.S. Cl. 437—51 **1 Claim**



1. A method of making an LED array, comprising:

a first process for sequentially forming an n-type junction layer, a p-type radiative layer, a current blocking layer of an n-type transparent layer over an n-type semiconductor substrate;

a second process for photo-etching said current blocking layer of the n-type transparent layer;

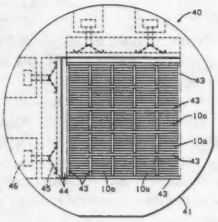
a third process for diffusing zinc in order to form a current injection region;
a fourth process for photo-etching for dividing the element into a plurality of segments and polishing the lower part of the element; and
a fifth process for forming a plurality of electrodes at a upper and lower part of the LED array.

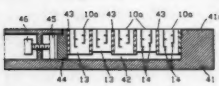
4,999,311

METHOD OF FABRICATING INTERCONNECTIONS TO I/O LEADS ON LAYERED ELECTRONIC ASSEMBLIES

John E. Dzarnoski, Jr., Poway, and James W. Babcock, Escondido, both of Calif., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Aug. 16, 1989, Ser. No. 395,237
Int. Cl.[5] H01L *21/70*
U.S. Cl. 437—51 **13 Claims**





1. A method of fabricating circuitry on separate layered electronic assemblies, including the steps of:
placing a plurality of said assemblies in a fixture with spacers between each assembly;
aligning to a single plane, one face of each assembly in said fixture on which said circuitry is to be formed:
mechanically squeezing said assemblies and spacers together with said fixture such that said aligned faces are held in said plane and are exposed;
depositing and patterning layers of insulative and conductive materials on all of said exposed faces in said fixture; and,
severing said layers between said faces in the space provided by said spacers.

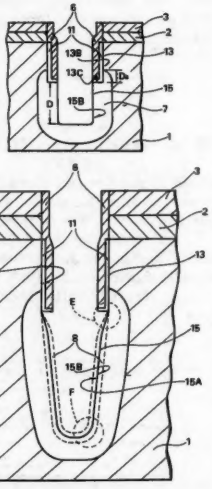
4,999,312

DOPING METHOD USING AN OXIDE FILM AND A NITRIDE FILM ON THE TRENCH WALL TO MANUFACTURE A SEMICONDUCTOR DEVICE AND THE MANUFACTURED DEVICE

Yong H. Yoon, Seoul, Rep. of Korea, assignor to Hyundai Electronics Industries Co., Ltd., Kyungki, Rep. of Korea

Filed Aug. 16, 1989, Ser. No. 394,380
Claims priority, application Rep. of Korea, Aug. 18, 1988, 10483/88
Int. Cl.[5] H01L *21/70*
U.S. Cl. 437—52 **2 Claims**

1. A doping method for a side wall of a trench capacitor comprising:
providing a silicon wafer;
sequentially forming a mask layer including a first oxide layer, a nitride layer and a second oxide layer on the silicon wafer and then depositing a photoresist layer on the second oxide layer;
forming a first mask pattern by removing a portion of the photoresist layer to expose a portion of the second oxide layer;
forming a second mask pattern by removing the portion of the exposed second oxide layer, the nitride layer and first oxide layer underlying the exposed second oxide layer to expose the silicon wafer;
removing any remaining photoresist layer;
forming a first trench having an inner wall and an outer wall and a bottom in the silicon wafer exposed by the formation of the second mask pattern and then rinsing the first trench;
depositing an oxide film on the inner wall and the bottom of the first trench and forming a nitride film on the entire surface of the oxide film, the mask layer including the second oxide layer of the mask layer;
removing a portion of the oxide film and the nitride film from the bottom of the first trench concurrently with removing the nitride film formed on the second oxide layer of the mask layer with n anisotropic etching process, and then removing the second oxide layer beneath the nitride film;



forming a second trench in the silicon wafer, exposed by removing a portion of the nitride and the oxide film, from the bottom of the first trench, and rinsing the second trench;
depositing a dopant source on the entire surface of the inner wall of the second trench, on the nitride film and on the nitride layer, with the oxide film and the nitride film on the first trench wall providing a protective film to prevent the impurity of the dopant source from diffusing into the silicon wafer adjacent to the outer wall of the first trench;
forming an impurity doped region in the silicon wafer adjacent to the outer wall of the second trench;
forming an oxidation region on the inner and outer walls of the second trench by performing an oxidation process along the inner wall of the second trench having the impurity doped region on the outer wall thereof; and
removing the nitride film and the oxide film formed on the inner wall of the first trench, and removing the oxidation region formed on the inner and outer wall of the second trench thereby providing a substantially flat interface between the first and second trench to form a smooth step difference between the first trench and the second trench.

4,999,313

PREPARATION OF A SEMICONDUCTOR ARTICLE USING AN AMORPHOUS SEED TO GROW SINGLE CRYSTAL SEMICONDUCTOR MATERIAL

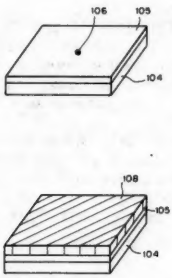
Shiro Arikawa, and Takao Yonehara, both of Atsugi, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 427,906, Oct. 24, 1989, abandoned, which is a continuation of Ser. No. 114,870, Oct. 30, 1987, abandoned. This application May 29, 1990, Ser. No. 528,916

Claims priority, application Japan, Nov. 7, 1986, 61-264027

Int. Cl.[5] H01L *21/00, 21/02, 21/20, 21/76*

U.S. Cl. 437—84 **3 Claims**



1. A process for producing a semiconductor article, the process comprising the steps of:

forming a plurality of concavities each having an exposed surface of an amorphous material on an insulator substrate; and

forming in at least one of the concavities a semiconductor single crystal region of one electroconductive type and forming in at least a second one of the concavities a semiconductor single crystal region of the opposite electroconductive type, at least the semiconductor single crystal region of the one electroconductive type being provided by forming a different amorphous material having a nucleation density sufficiently greater than the insulator substrate and sufficiently small area so as to grow only one single nucleus becoming a single crystal of a semiconductor material through crystal growth on the insulator substrate and growing semiconductor material around the single nucleus formed as a center, using a gas phase growth method.

4,999,314

METHOD FOR MAKING AN ALTERNATION OF LAYERS OF MONOCRYSTALLINE SEMICONDUCTING MATERIAL AND LAYERS OF INSULATING MATERIAL

Didier Pribat, Paris, and Léonidas Karapiperis, Bourg-la-Reine, both of France, assignors to Thomson-CSF, Puteaux, France

Filed Apr. 4, 1989, Ser. No. 333,016

Claims priority, application France, Apr. 5, 1988, 88 04438

Int. Cl.[5] H01L *21/20*

U.S. Cl. 437—89 **16 Claims**

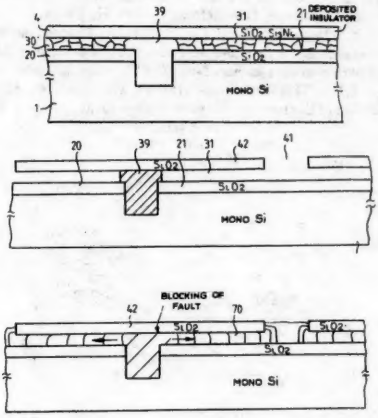
1. A method for the fabrication of a thin monocrystalline layer of a semiconducting material, through growth by chemical vapor deposition (CVD), wherein crystal growth is initiated on at least one seed having a chemical composition which is the same or is different from that of the semiconducting material of the thin layer to be obtained, said crystal growth being confined within a space located between two confinement layers each made of a material different from the semiconducting material of the thin layer in such a way that there can be neither nucleation nor deposition of semiconducting material on exposed surfaces of the two confinement layers, the space between the two confinement layers defining the thickness of the semiconductor monocrystalline thin layer to be obtained,

wherein making the seed of monocrystalline semiconducting material comprises the steps of:

depositing, on a substrate, of a first confinement layer;

etching in the first confinement layer at least one aperture;

selectively growing a first semiconducting material, the first semiconducting material being monocrystalline in the



aperture and polycrystalline on the first confinement layer; and

covering the first semiconducting material by a second confinement layer in which at least one aperture is made and the polycrystalline semiconducting material is removed therethrough.

4,999,315

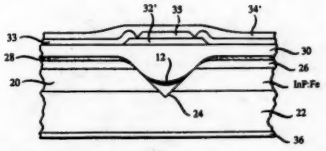
METHOD OF CONTROLLING DOPANT INCORPORATION IN HIGH RESISTIVITY IN-BASED COMPOUND GROUP III-V EPITAXIAL LAYERS

Wilbur D. Johnston, Jr., Mendham; Robert F. Karlicek, Jr., South Plainfield; Judith A. Long, Millburn, and Daniel P. Wilt, Scotch Plains, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 183,796, Apr. 20, 1988, Pat. No. 4,888,624, which is a continuation-in-part of Ser. No. 4,919, Jan. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 621,071, Jun. 15, 1984, Pat. No. 4,660,208. This application Dec. 15, 1989, Ser. No. 450,973

Int. Cl.[5] H01L *21/20*

U.S. Cl. 439—94 **12 Claims**



1. A method of fabricating a device, which includes an iron-doped, indium-based, compound Group III-V semiconductor region, comprising the steps of (1) forming a precursor gas comprising a carrier gas, a volatile dopant compound, a volatile indium compound and a Group V hydride, (2) directing said precursor gas through a heated chamber to contact a heated deposition body, and (3) inducing deposition of said compound semiconductor on said body,

said carrier gas comprises an inert gas, said dopant compound includes iron, the concentration of hydrogen in said

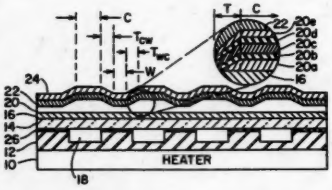
precursor gas is limited to prevent excessive precipitation of iron, and the concentrations of said volatile indium compound at said body and of said Group V hydride are maintained sufficient to result in said deposition.

4,999,316

METHOD FOR FORMING TAPERED LASER OR WAVEGUIDE OPTOELECTRONIC STRUCTURES

William D. Goodhue, Chelmsford; Robert H. Rediker, Watertown, and Donald E. Bossi, Cambridge, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Continuation-in-part of Ser. No. 171,952, Mar. 23, 1988, Pat. No. 4,855,255. This application Mar. 17, 1989, Ser. No. 325,290
The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.
Int. Cl.[5] H01L *21/18*
U.S. Cl. 437—129 15 Claims



1. A method of forming regions of alternate uniform and non-uniform thickness of III-V compound layers on a heated substrate comprising the steps of:

(a) forming a first uniform thickness layer while non-uniformly heating the substrate at a first growth temperature below which the sticking coefficients of the III-V materials becomes substantially sensitive to the non-uniform heating;

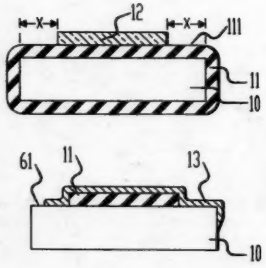
(b) forming a first non-uniform thickness layer on said first uniform layer while non-uniformly heating the substrate at a second growth temperature in which the sticking coefficients of the III-V materials becomes substantially sensitive to the non-uniform heating.

4,999,317

METALLIZATION PROCESSING

Chih-Yuan Lu; Janmye Sung, both of Lower Macungie Township, Lehigh County, and Yiu M. Wong, Wescosville, all of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 29, 1989, Ser. No. 414,888
Int. Cl.[5] H01L *21/48*
U.S. Cl. 437—189 17 Claims



1. In the manufacture of integrated-circuit devices, a method for forming a metal layer on a dielectric layer on a substrate comprising a semiconductor-device face, characterized by

forming a protective layer on a portion of said dielectric layer on said semiconductor-device face, thereby forming an assembly in which a first area comprising semiconductor device structures is protected, said first area excludes a peripheral region of said face,

exposing the resulting assembly to an etchant, thereby removing dielectric material from a second area which is comprised in the complement of said first area,

removing said protective layer,

forming an adhesive layer on at least said dielectric layer, and

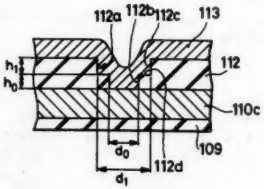
forming a metal layer on at least said adhesive layer.

4,999,318

METHOD FOR FORMING METAL LAYER INTERCONNECTS USING STEPPED VIA WALLS

Tokunaga Takahumi, Tokorozawa; Tsuneoka Masatoshi; Akimori Hiroyuki, both of Ohme, and Horiuch Mitsuaki, Hachiohji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 117,855, Nov. 6, 1987, abandoned. This application Jul. 6, 1989, Ser. No. 376,097
Claims priority, application Japan, Nov. 12, 1986, 61-267526; Dec. 8, 1986, 61-290410
Int. Cl.[5] H01L *21/44*
U.S. Cl. 437—194 12 Claims



1. A method of manufacturing a semiconductor integrated circuit device comprising the steps of:

(a) preparing a semiconductor substrate having a main surface;

(b) forming a plurality of semiconductor elements on said main surface;

(c) forming a first inter-layer insulator film over a plurality of said semiconductor elements;

(d) forming a first contact hole in said first inter-layer insulator film;

(e) forming a first wiring layer on said first inter-layer insulator film, said first wiring layer being made of a material whose principal component is aluminum and being electrically connected with at least one of said semiconductor elements via said first contact hole;

(f) forming a second inter-layer insulator film over said first wiring layer;

(g) forming a second contact hole in said second inter-layer insulator film by etching to an upper surface of said first wiring layer, a sectional shape of said second contact hole being a configuration which has a plurality of stair-like steps along each of peripheral walls of said second contact hole, said stair-like steps being formed by first peripheral wall planes extending in a vertical direction and a second peripheral wall plane extending in a horizontal direction, said each first peripheral wall plane and said second peripheral wall plane defining an angle of substantially 90 degrees;

(h) after step (g), sputter-etching at least said exposed upper surface of said first wiring layer;

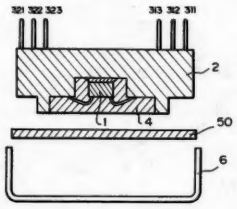
(i) forming a second wiring layer on said second inter-layer insulator film, said second wiring layer being electrically connected with said first wiring layer via said second contact hole.

4,999,319

METHOD OF MANUFACTURING SEMICONDUCTOR DEVICE HAVING PACKAGE STRUCTURE

Toshio Hamano, and Shigeo Natsume, both of Yokohama, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 225,578, Jul. 28, 1988, abandoned, which is a continuation of Ser. No. 27,935, Mar. 19, 1987, abandoned. This application Apr. 6, 1989, Ser. No. 333,810
Claims priority, application Japan, Mar. 19, 1986, 61-059481
Int. Cl.[5] H01L *21/58*
U.S. Cl. 437—209 9 Claims



1. A method of manufacturing a semiconductor device having a package structure comprising a lead base having a planar shape and having an upper face and lower face, a semiconductor chip being fixed to the upper face, and a cap having a recess therein having a flat bottom surface, for accommodating the planar lead base, said method comprising the steps of:

(a) fixing a semiconductor chip to a groove formed in the lead base;

(b) forming wires for connecting the semiconductor chip to the lead base;

(c) placing a flat pellet including a plastic over the wires, lead base, and semiconductor chip;

(d) melting the flat pellet so as to entirely fill the groove and to cover the wires;

(e) placing a flat fixation pellet on the bottom surface in the cap, the flat fixation pellet, having a substantially planar shape and an area equal to the area of the bottom surface of the cap, being made of material which melts and subsequently hardens by a rise in temperature;

(f) placing the lead base carrying the semiconductor chip upside-down on the flat fixation pellet in the cap; and

(g) heating the flat fixation pellet between the cap and the lead base carrying the semiconductor chip to melt the flat fixation pellet and subsequently harden the melted fixation pellet, the lead base carrying the semiconductor chip being fixed to the cap to form a package structure.

4,999,320

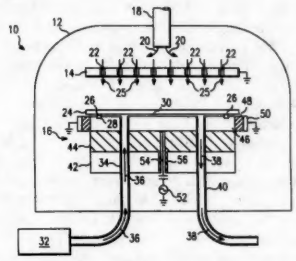
METHOD FOR SUPPRESSING IONIZATION AVALANCHES IN A HELIUM WAFER COOLING ASSEMBLY

Monte A. Douglas, Coppell, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 176,071, Mar. 31, 1988, abandoned. This application May 23, 1989, Ser. No. 356,585
Int. Cl.[5] H01L *21/302*
U.S. Cl. 437—225 16 Claims

1. A method for preventing arc damage in a semiconductor wafer processing apparatus having a cooling device, comprising the steps of:

mixing a thermally conductive gas with an electron scavenging agent; and



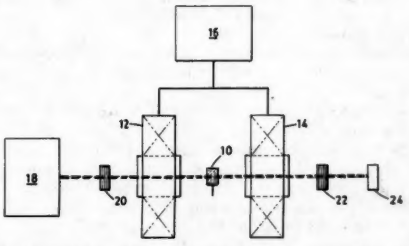
introducing said mixed thermally conductive gas and electron scavenging agent into the cooling device.

4,999,321

OPTICAL GLASS COMPOSITION

Jeffrey T. Kohli, Alfred, N.Y., assignor to Alfred University, Alfred, N.Y.

Filed Mar. 2, 1990, Ser. No. 487,102
Int. Cl.[5] C03L *3/253*
U.S. Cl. 501—42 18 Claims



1. An isotropic glass composition which comprises from about 50 to about 75 mole percent of germania, from about 10 to about 25 mole percent of an oxide selected from the group consisting of gallia, alumina, and mixtures thereof, and from about 10 to about 25 mole percent of an oxide selected from the group consisting of terbium oxide, dysprosium oxide, gadolinium oxide, and mixtures thereof, wherein said glass composition is comprised of at least about 85 mole percent of a mixture of oxides selected from the group consisting of germania, gallia, alumina, terbium oxide, gadolinium oxide, and dysprosium oxide.

4,999,322

HIGH-TEMPERATURE POROUS-CERAMIC SUPERCONDUCTORS

Franklin G. Reick, Westwood, N.J., assignor to Michael Ebert, New York, N.Y.

Filed Jan. 26, 1989, Ser. No. 301,480
Int. Cl.[5] H01D *12/00*; H01L *39/12*
U.S. Cl. 501—83 12 Claims

1. A method for producing a porous, high-temperature ceramic body having superconductive properties when the body is subjected to liquid nitrogen, comprising the steps of:

(a) mixing together powders in a stoichiometric ratio constituting the essential components of a copper-oxide composition capable of forming a ceramic having high-temperature superconductive properties at liquid nitrogen temperatures to provide a stock mixture:

(b) firing the stock mixture in a crucible to produce a sin-

tered clinker, and grinding the clinker to provide fine particles;

(c) intermixing the particles with celluloxic fibers to form a master mixture which is then compressed at a pressure sufficient to crush the fibers therein to form fiber-reinforced green pellets, the amount of fibers being sufficient to produce the channels called for in the next step;

(d) firing the pellets in air in a furnace at a temperature of about 400° C. and for an initial period sufficient to cause the fibers therein to burn out and lose their identity to define interlaced diffusion channels in the pellets; and

(e) continuing to fire the pellets in the furnace in flowing oxygen at an elevated temperature exceeding about 900° for a final period sufficient to cause the compressed particles to sinter together to produce a porous ceramic body, during which period the oxygen diffuses through the channels to react and integrate with the interior of the body, whereby the resultant body is superconductive throughout its structure.

4,999,323

PRODUCTION OF CERAMIC POWDERS BY EMULSION PRECIPITATION PROCESSES AND THE PRODUCTS THEREOF

Jean V. Sang, Kingston, and Carson J. Ogilvie, Yarker, both of Canada, assignors to Alcan International Limited, Montreal, Canada

Filed Aug. 3, 1988, Ser. No. 227,755

Claims priority, application Canada, Aug. 19, 1987, 544,868

Int. Cl.[5] A61J *5/00*

U.S. Cl. 501—103 **13 Claims**

1. An emulsion precipitation process for the production of precursor powders for the production of ceramic materials, characterised by the steps of:

(a) producing an aqueous solution of the respective cation or mixture of cations;

(b) dispersing the aqueous solution in a non-miscible liquid to form an emulsion of aqueous particles in the non-miscible liquid of average particle size in the range 0.1 to 1 micrometer, the emulsion including from about 2% to 10% by volume of a surfactant to stabilize the emulsion;

(c) contacting the emulsion with a gaseous reactant for the cation or cations that will react with the cation or cations to form a precipitate without breaking the emulsion; and

(d) subsequently removing the aqueous and non-miscible liquids and producing the respective precursor powders.

4,999,324

METHOD OF MANUFACTURING CERAMIC ARTIFACTS

Neil S. Carr, Kempton Park, and Adrian W. Paterson, Pretoria, both of South Africa, assignors to Pathold Investments, Co., Inc., Douglas, Isle of Man

Filed Dec. 12, 1988, Ser. No. 283,239

Claims priority, application South Africa, Jan. 18, 1988, 88/0316

Int. Cl.[5] C04B *35/10, 35/48*

U.S. Cl. 501—107 **9 Claims**

1. A method of manufacturing a structural ceramic artifact including the steps of:

forming a mixture in particulate form and with a particle size of at most 10 microns, of zircon or a precursor thereof, alumina or a precursor thereof, and a metal oxide dopant selected from the group consisting of barium oxide, strontium oxide, the precursors thereof, and mixtures of said metal oxides and precursors to provide a doped mixture of which said zircon or its precursor forms 20–80% by mass, the alumina or its precursor forms 20–80% by mass and said dopant forms 0.01–25% by mass;

forming a green artifact from the mixture; and

sintering the green artifact by heating up to a maximum temperature in the range 1200°–1700° C.

4,999,325

REBONDED FUSED BRICK

David J. Michael, 2615 Poinsettia Dr., White Oak, Pa. 15131

Filed Oct. 28, 1988, Ser. No. 264,117

Int. Cl.[5] C04B *35/04, 35/12*

U.S. Cl. 501—115 **10 Claims**

1. A rebonded, fused brick resulting from burning a mix consisting essentially of a fused magnesite-chrome grain, a fused chrome-magnesite grain, or mixtures thereof, and a chrome ore having a $Cr_2O_3/(Al_2O_3+Fe_2O_3)$ weight ratio of at least about 1.15, a maximum silica content of about 3.85% by weight and an Fe_2O_3 content of less than about 25% by weight.

4,999,326

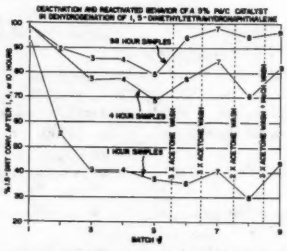
PALLADIUM CATALYST REACTIVATION

David L. Sikkenga; Ian C. Zaenger, both of Wheaton, Ill., and Gregory S. Williams, Tampa, Fla., assignors to Amoco Corporation, Chicago, Ill.

Filed Jun. 18, 1990, Ser. No. 539,619

Int. Cl.[5] B01J *23/96, 38/54, 38/52;* **C07C** *5/367*

U.S. Cl. 502—30 **17 Claims**


DEACTIVATION AND REACTIVATED BEHAVIOR OF A 3% Pd/C CATALYST IN DEHYDROGENATION OF 1, 5 - DIMETHYLTETRAHYDRONAPHTHALENE
96 HOUR SAMPLES
4 HOUR SAMPLES
1 HOUR SAMPLES
BATCH #

1. A process for reactivating a deactivated supported palladium catalyst used in the dehydrogenation of dimethyltertrahydronapthalenes to dimethylnapthalenes comprising contacting the catalyst with an organic polar solvent for naphthalenic compounds at a temperature below about 200° C. for a time period sufficient to increase the catalytic activity of the catalyst; said organic polar solvent having a dielectric constant at 25° C. in the range of about 4 to about 80 and a boiling point at atmospheric pressure in the range of about 30° C. to about 230° C.

4,999,327

CATALYST FOR REGULATING THE MOLECULAR WEIGHT DISTRIBUTION OF ETHYLENE POLYMERS

Sun-Chueh Kao, Piscataway, and Frederick J. Karol, Belle Mead, both of N.J., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Dec. 30, 1988, Ser. No. 292,268

Int. Cl.[5] C08F *4/68*

U.S. Cl. 502—119 **18 Claims**

1. A solid catalyst precursor consisting of:

(1) a solid, particulate, porous, inorganic carrier, as support for

(2) the reaction product of (a) a vanadium trihalide and (b) an electron donor,

(3) a boron halide or alkylaluminum modifier, and

(4) a silicon containing molecular weight distribution regulator having the formula

$$(RO)_nSiR^1_{(4-n)}$$

wherein:

R is a monovalent hydrocarbon radical free of aliphatic unsaturation containing from 1 to 14 carbon atoms,

R^1 is a monovalent hydrocarbon radical free of aliphatic unsaturation containing from 1 to 14 carbon atoms, and

n is an integer having a value of from 1 to 4.

4,999,328

HYDROCRACKING OF HEAVY OILS IN PRESENCE OF PETROLEUM COKE DERIVED FROM HEAVY OIL COKING OPERATIONS

Anil K. Jain, and Barry B. Pruden, both of Oakville, Canada, assignors to Petro-Canada Inc., Mississauga, Canada

Filed Jun. 28, 1988, Ser. No. 213,298

Int. Cl.[5] B01J *31/00*

U.S. Cl. 502—151 **10 Claims**

1. A process for producing a hydroconversion catalyst for the hydroconversion of heavy hydrocarbon oils which comprises grinding petroleum coke particles and particles of an iron compound which is capable of converting to iron sulphide under hydroconversion conditions in the presence of a petroleum oil to form a paste or slurry in which the petroleum coke and iron compound have been ground to particle sizes of less than 75 microns.

4,999,329

CATALYST FOR THE PRODUCTION OF POLYALKYLENEPOLYAMINES

Stephen J. Webster, Angleton, and Lester L. Melton, Richwood, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 6, 1989, Ser. No. 418,291

Int. Cl.[5] B01J *27/02, 27/06, 27/14, 27/16*

U.S. Cl. 502—202 **14 Claims**

1. A catalyst for making a polyalkylenepolyamine by reacting a monoalkanolamine with an alkylene-amine which comprises a metal oxide support the surface of which is impregnated with at least one compound which contains phosphorus and at least one which contains fluorine wherein the metal oxide support is an oxide of a metal selected from Groups IIIA, IIIB, IVB or VB of the periodic chart and (A) wherein the phosphorus and fluorine are in the same compound and wherein the compound is a fluorophosphoric acid or (B) wherein the phosphorus and fluorine are in different compounds and wherein the phosphorus compound is boron phosphate, phosphoric acid, phosphorus pentoxide, phosphorous acid, phosphoryl chloride, thiophosphoryl chloride or chlorophosphoric acid; and the fluorine containing compound is hydrofluoric acid, fluorosulfonic acid, or difluorophosphoric acid.

4,999,330

HIGH-DENSITY ADSORBENT AND METHOD OF PRODUCING SAME

Tapan K. Bose; Richard Chahine, and Jean-Marie St-Arnaud, all of Trois-Rivières, Canada, assignors to Universite du Quebec a Trois-Rivieres, Trois-Rivieres; Societe Quebecoise d'Initiatives Petrolieres, Sainte-Foy and Gas Metropolitain Inc., Montreal, all of, Canada

Continuation-in-part of Ser. No. 171,744, Mar. 22, 1988, abandoned. This application Feb. 21, 1989, Ser. No. 312,940

Int. Cl.[5] B01J *20/26, 20/20;* F17C *11/00;* C01B *31/00*

U.S. Cl. 502—402 **23 Claims**

1. A method of producing a dimensionally stable, high-density adsorbent, comprising the steps of:

a) mixing high surface area carbon particles with a solution of a binder in a solvent to form a slurry and thereby wet each particle of carbon with the solution of binder, said binder being selected from the group consisting of methylcellulose and a polyvinyl alcohol;

b) removing the solvent from the slurry prepared in step (a) to obtain particles of carbon coated with a film of the binder; and

c) compacting the binder-coated particles of carbon under pressure of about 140 to about 600 MPA to provide a compacted mass of high surface area carbon particles bound together and defining a network of substantially to cause a reduction of about 50 to about 200% in bulk volume of the mass and a corresponding increase of about 50 to about 200% in density, thereby obtaining an adsorbent ca$_{\mu}$able of withstanding powdering when subjected to vibration and exhibiting a gas storage capacity increase of about 20 to about 100% over that of the high surface area carbon particles in loose form.

4,999,331

PHOTO AND PRESSURE SENSITIVE RECORDING MEDIUM

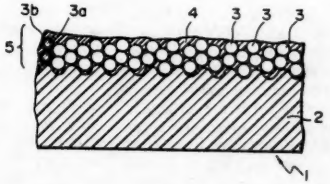
Takemi Yamamoto, and Shunichi Higashiyama, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Feb. 8, 1989, Ser. No. 308,404

Claims priority, application Japan, Feb. 12, 1988, 63-31454; Apr. 5, 1988, 63-83271

Int. Cl.[5] B41M *5/22*

U.S. Cl. 503—200 **7 Claims**



1. In a photo and pressure sensitive recording medium of the type comprising:

a microcapsule sheet including a plastic substrate sheet and a layer formed of a mixture of a plurality of photo-curable microcapsules and resinous binder, said layer being carried on a side of said substrate sheet, said microcapsules each containing a dye precursor, photo-curable resin, and polymerization initiator, wherein when said microcapsule sheet is exposed to ling in accordance with an image to be developed, said microcapsules coated on an area corresponding to said image are cured, and

a developing sheet, said developing sheet being coated with a developer material which is reactable with said dye precursor, said developing sheet being arranged to be superimposed over and pressurized with said microcapsule sheet so that a visible image corresponding to said image is formed on said developing sheet by means of a reaction between said developer material and said dye precursor streamed out of the uncured microcapsules;

the improvement wherein said substrate sheet has fine irregularities formed therein by adhesion-facilitating processing on said side on which said layer is formed whereby a high adhesion strength of said microcapsules to said substrate sheet is formed so that cured microcapsules are prevented from adhering to said developing sheet when said microcapsules sheet and said developing sheet are superimposed against and pressurized with each other.

4,999,332

HEAT-SENSITIVE RECORDING MATERIAL

Fumio Okumura, Kunitachi; Akinori Okada, Tokyo, and Kazuyoshi Kondo, Himezi, all of Japan, assignors to Mitsubishi Paper Mills, Limited, Tokyo, Japan

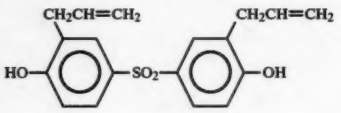
Filed Sep. 8, 1988, Ser. No. 241,849

Claims priority, application Japan, Sep. 8, 1987, 62-225665; Dec. 7, 1987, 62-310321; Jan. 8, 1988, 63-2344

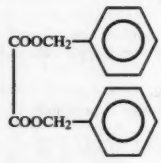
Int. Cl.[5] B41M *5/18*

U.S. Cl. 503—209 8 Claims

1. A heat sensitive recording material comprising a dye precursor which is colorless or light-colored in the usual state, a compound of the following chemical formula (I) as a color developing agent which reacts with said dye precursor upon heating to develop a color, and a compound of the following chemical formula (II) as a sensitizer:



[I]



[II]

4,999,333

HEAT SENSITIVE RECORDING MATERIAL

Toshimasa Usami; Seiji Hatakeyama; Akihiro Shimomura, and Ken Iwakura, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 3, 1988, Ser. No. 252,615

Claims priority, application Japan, Oct. 2, 1987, 62-250457; Oct. 2, 1987, 62-250458; Oct. 15, 1987, 62-260371; Oct. 19, 1987, 62-264824; Oct. 20, 1987, 62-265135

Int. Cl.[5] B41M *5/18*

U.S. Cl. 503—209 9 Claims

1. A heat sensitive recording material which is comprised of a support having thereon a transparent heat sensitive layer comprising a binder, a color developer, an organic solvent for a color developer slightly soluble or insoluble in water, a water soluble polymer which functions as a protective colloid for the color developer and a microcapsule containing an electron donating dye precursor, said water soluble polymer comprising a partially saponified polyvinyl alcohol, wherein said transparent heat sensitive layer is prepared by coating a solution obtained by mixing the microcapsule containing the electron donating dye precursor with an emulsion prepared by dispersing the color developer dissolved in the organic solvent into an aqueous solution containing the water soluble polymer.

4,999,334

PROTECTIVE COATING FOR THERMAL IMAGES

Rajendra Mehta, Centerville; Dale Lakes, and William Saluke, both of Dayton, all of Ohio, assignors to The Standard Register Co., Dayton, Ohio

Filed Mar. 1, 1990, Ser. No. 486,944

Int. Cl.[5] B41M *5/18*

U.S. Cl. 503—226 15 Claims

1. A thermally sensitive printable paper which is resistant to solvents, abrasion, and fading from exposure to light comprising a thermally printable paper substrate having a thermally imageable coating thereon and a protective coating layer over said thermally imageable coating comprising a mixture of an aliphatic urethane acrylate, an epoxy diacrylate, trimethylolpropane triacrylate, 1,6-hexanediol diacrylate, a multifunctional polyester acrylate, and a photocatalyst.

4,999,335

THERMAL DYE TRANSFER RECEIVING ELEMENT WITH BLENDED POLYETHYLENE/POLYPROPYLENE-COATED PAPER SUPPORT

William A. Mruk; Daniel J. Harrison, both of Rochester, and Bruce C. Campbell, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 11, 1989, Ser. No. 449,630

Int. Cl.[5] B41M *5/035, 5/26*

U.S. Cl. 503—227 20 Claims

1. In a dye-receiving element for thermal dye transfer comprising a resin-coated paper support having thereon a polymeric dye image-receiving layer, the improvement wherein the resin coating comprises a blend of polyethylene and polypropylene substantially free of microvoids.

4,999,336

DISPERSION STRENGTHENED METAL COMPOSITES

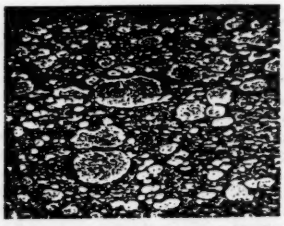
Anil Nadkarni, Mentor; Prasan K. Samal, Pepper Pike, both of Ohio, and James E. Synk, New York, N.Y., assignors to SCM Metal Products, Inc., Cleveland, Ohio

Continuation-in-part of Ser. No. 561,035, Dec. 13, 1983, Pat. No. 4,752,334. This application Jun. 17, 1988, Ser. No. 208,377

The portion of the term of this patent subsequent to Apr. 3, 2001, has been disclaimed.

Int. Cl.[5] H01L *39/12, 5/08, 39/24*

U.S. Cl. 505—1 53 Claims



1. A substantially fully dense compacted and unsintered powdered metal composite, comprising: (a) a metal or metal alloy matrix having uniformly dispersed therein discrete microparticles of a refractory metal oxide and (b) discrete macroparticles of an additive material.

4,999,337

SUPERCONDUCTIVE TRANSISTOR

Takahiro Yamada, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Feb. 6, 1989, Ser. No. 306,751

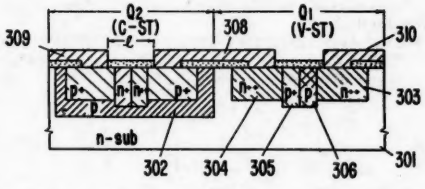
Claims priority, application Japan, Mar. 3, 1988, 63-49981

Int. Cl.[5] H01B *12/00;* H01L *39/22, 27/00, 45/00*

U.S. Cl. 505—1 2 Claims

1. A superconductive transistor comprising: a high resistance semiconductor region of a first type of conductivity; a source region and a drain region of said first type of conductivity at a high impurity concentration formed in said high resistance semiconductor region; a gate region of a second type of conductivity at a high impurity concentration formed between said source and drain regions, and a source electrode, drain electrode and gate electrode respectively connected to said source region, drain region and gate region; which said source, drain and gate electrodes are made of high temperature superconductive materials, and the dimensions and impurity concentrations are selected so that the coherence lengths ξ_{NS}, ξ_{ND}, ξ_{NG} of the wave functions of superconductive electron pairs of

said electrodes spreading within the semiconductor do not intersect in the thermal balance state, and wherein tunneling of the superconductive electron pairs may occur between the source and gate, and between the drain and gate when a voltage corresponding to the energy gap of said superconductive



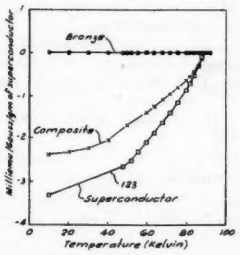
materials is applied to said gate electrode; wherein the drain side of said gate region is higher in its impurity concentration than the gate side thereof, and tunneling of superconductive electron pairs occurs between said drain and gate even in the thermal balance state.

4,999,338

PREPARATION OF METAL/SUPERCONDUCTING OXIDE COMPOSITES

Sunil D. Wijeyesekera, and Robert H. Heistand, II, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 23, 1990, Ser. No. 484,148
Int. Cl.[5] H01L *39/12*
U.S. Cl. 505—1 **25 Claims**



1. A method for preparing a superconducting ceramic-metal composite article comprising:

a. heating an admixture of a superconducting oxide and a metal to a temperature which is high enough to allow the admixture to be densified under pressure to more than about 80 percent of the admixture's theoretical density but low enough to substantially preclude melting of the admixture or any of its components and minimize adverse reactions between the superconducting oxide and the metal; and

b. subjecting said heated admixture to a pressure in excess of 15,000 pounds per square inch (103 megapascals) for a period of time sufficient to form a densified article having a density of greater than about 80% of the admixture's theoretical density.

4,999,339

COMBINATION THERAPY OF IL-2 AND DTIC FOR THE TREATMENT OF MELANOMA

Carolyn M. Paradise, Emeryville, and Edward C. Bradley, Moraga, both of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Filed Mar. 28, 1988, Ser. No. 174,000
Int. Cl.[5] A61K *37/00, 31/415, 39/00, 45/02*
U.S. Cl. 514—2 **28 Claims**

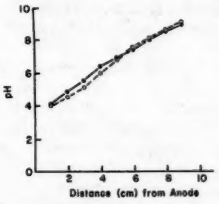
1. A method for the treatment of melanoma in a human patient having said disease comprising parenterally administering to said patient a syngeristic combination of biologically active IL-2 and DTIC effective to cause regression of the melanoma, wherein the IL-2 is des-ala$_1$ser$_{125}$IL-2.

4,999,340

REHYDRATABLE AGAROSE GELS

Wayne L. Hoffman, and Adrien A. Jump, both of Dallas, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

Filed Aug. 4, 1988, Ser. No. 229,071
Int. Cl.[5] A61K *31/00;* **C08J** *3/00*
U.S. Cl. 514—23 **36 Claims**



1. A method for separating biological molecules by subjection of said molecules to a separation system in a gel medium, the method comprising the steps of:

preparing a first gel slab consisting essentially of between about 0.5% and about 2.0% agarose and between about 0.1% and about 5% water-soluble substantially nonionic synthetic linear polymer;

drying said slab to produce a dried gel precursor sheet;

immersing the dried gel precursor sheet for at least 30 min in an aqueous separation solvent compatible with a separation system to be utilized to form a rehydrated and equilibrated gel slab having at least about 75% of its original wet weight, wherein said rehydrated gel as a porosity about equal to that of the first gel slab;

applying a biological sample comprising macromolecules to the rehydrated gel slab; and

subjecting the biological sample comprising macromolecules in the rehydrated gel slab to forces of the separation system to separate said macromolecules.

4,999,341

APPETITE MODERATING AND ANTI-GASTRITIS COMPOSITION

Antonio Ferro, Via Maraini 7, 6900 Lugano (Svizzera), Italy

Continuation of Ser. No. 243,192, Sep. 8, 1988, abandoned, which is a continuation of Ser. No. 909,930, Sep. 22, 1986, abandoned. This application Sep. 27, 1989, Ser. No. 414,738
Claims priority, application Italy, Sep. 26, 1985, 22284 A/85
Int. Cl.[5] A61K *31/70, 31/73*
U.S. Cl. 514—33 **5 Claims**

1. An oral composition comprising:

from 400 to 1000 parts by weight aminopolysaccharide selected from the group consisting of chitin, chitosan and pharmaceutically acceptable salts thereof; and

from 1 to 16 parts by weight soy saponin.

4,999,342

LONG LASTING CONTRACEPTIVE SUPPOSITORY COMPOSITION AND METHODS OF USE

Nawaz Ahmad, Piscataway; George A. Ziets, Flemington, and Sudeb Das, Dayton Square, all of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Aug. 16, 1988, Ser. No. 232,816
Int. Cl.[5] A61K *31/00*
U.S. Cl. 514—54 **15 Claims**

1. A long lasting viscous adhesive contraceptive suppository composition comprising a mixture of a contraceptive effective amount of spermicidal agent; a polymeric gum; a dispersing agent comprising silica; and a water miscible polymer suppository base.

2. A composition according to claim 1 wherein the polymeric gum is a polysaccharide gum and the water miscible polymer is polyethylene glycol.

4,999,343

PRODUCTION OF POLYSACCHARIDES AND SAPONIN OF DANGSHEN

Yaguang Liu, 30 Seaman Ave., New York, N.Y. 10034

Division of Ser. No. 910,240, Sep. 22, 1986, Pat. No. 4,906,470. This application Dec. 13, 1989, Ser. No. 449,745
Int. Cl.[5] A61K *31/711, 31/34*
U.S. Cl. 514—54 **3 Claims**

1. A process for producing polysaccharide of Dangshen comprising:

a. extracting ground roots of a plant selected from the group consisting of Codonopsis pilosula Nannf, Codonopsis clematidea Clarke and Codonopsis tangshen Oliver with 95% ethanol;

b. recovering the ethanol extract containing saponin of Dangshen and the remaining ground roots containing polysaccharide of Dangshen;

c. extracting the remaining ground roots with boiling water and simmering for 3 hours;

d. filtering the aqueous extract from the ground roots, followed by cooling and filtering to yield a filtrate;

e. centrifuging said filtrate to yield a supernatant layer;

f. mixing the supernatant layer with twice of its volume of 95% ethanol and distilling the mixture under reduced pressure to yield a residue;

g. dissolving the residue in warm water;

h. mixing the resulting aqueous solution with ethanol to yield a precipitate of polysaccharide of Dangshen.

i. recovering the precipitate and drying under vacuum.

4,999,344

PHOSPHATIDYL TREATMENT OF RAPIDLY PROLIFERATING CELLS

Marti Jett-Tilton, Washington, D.C., and Carl R. Alving, Bethesda, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 117,601, Nov. 6, 1987, abandoned, which is a division of Ser. No. 911,689, Sep. 25, 1986, abandoned. This application Mar. 14, 1988, Ser. No. 168,079
Int. Cl.[5] A01N *31/66;* A61K *31/685*
U.S. Cl. 514—77 **48 Claims**

1. A method for inhibiting the proliferation of rapidly proliferating abnormal mammalian cells, said method comprising:

contacting said cells with a cell proliferating inhibiting amount of a diacyl phosphatide, wherein the sn2-acyl group is a polyunsaturated fatty acid, said contacting being in the substantial absence of non-phosphatidic fatty acid esters having fewer than 2 olefinic sites of unsaturation in the fatty acid of said ester, for a sufficient time to inhibit said proliferation.

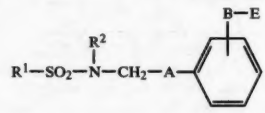
4,999,345

SULFONAMIDE DERIVATIVES AND DRUGS OBTAINED THEREFROM

Bernhard Schmied, Frankenthal; Hand D. Lehmann, Hirschberg; Verena Baldinger, Heidelberg, and Klaus Ruebsamen, Neustadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed May 26, 1989, Ser. No. 357,266
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1988, 3819052
Int. Cl.[5] A61K *31/18;* C07C *311/19, 317/14;* C07D *257/04*
U.S. Cl. 514—117 **8 Claims**

1. A sulfonamide derivative of the formula (I):



I

wherein R^1 is a C_1–C_4-alkyl, unsubstituted phenyl or phenyl substituted by halogen, trifluoromethyl or C_1–C_4-alkyl; R^2 is hydrogen or C_1–C_4-alkyl; A is a bridge member $CHOR^3$, C=O, C=S or C=N—OR^4; R^3 is hydrogen, C_1–C_4-alkyl, phenyl, benzyl or C_1–C_4-acyl; R^4 is hydrogen or methyl; B is methylene or ethylene in the m or p position, or if A is not carbonyl, B is methyleneoxy, with the oxygen atom thereof being bonded to the phenyl ring; and E is a tetrazol-5-yl, carboxyl, phosphonic acid or sulfo radical, or the physiologically acceptable salts thereof, or esters thereof with C_1–C_4-alcohols or amides thereof.

3. A pharmaceutical composition for the treatment and prophylaxis of thromboembolic disorders, and for the prophylaxis of arteriosclerosis and of metastasis, which comprises an effective amount of the compound of claim 1, and a pharmaceutically acceptable excipient.

4,999,346

NOVEL COMPOSITION AND PROCESS FOR CONTROL OF COCKROACH POPULATION

Robin R. Rudolph, Grand Prairie, Tex., assignor to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 162,936, Mar. 2, 1988, abandoned, which is a continuation-in-part of Ser. No. 884,855, Jul. 14, 1986, abandoned, which is a continuation-in-part of Ser. No. 683,984, Dec. 20, 1984, abandoned, which is a continuation-in-part of Ser. No. 680,676, Dec. 12, 1984, abandoned. This application Jul. 3, 1989, Ser. No. 377,376
Int. Cl.[5] A01N *37/06, 57/00*
U.S. Cl. 514—120 **19 Claims**

1. A method for the control of a cockroach population which method comprises applying to the locus of the cockroach infestation a synergistic effective amount of propetamphos in an amount of from 52–224 mg/m^2 and hydroprene in an amount of from 1 to 50 mg/m^2.

4,999,347

ANALGESIC METHOD

John R. J. Sorenson, 4301 W. Markham, Little Rock, Ark. 72201

Continuation of Ser. No. 901,191, Aug. 28, 1986, abandoned. This application Oct. 20, 1989, Ser. No. 426,456
Int. Cl.[5] A61K *31/60, 31/335, 31/555*
U.S. Cl. 514—159 **10 Claims**

1. A process for effecting analgesia in an animal body consisting essentially of:

administering to said animal body a copper coordination compound produced by reacting a copper salt with an aromatic carboxylic acid selected from the group consisting of 3,5-diisopropylsalicylic acid, acetylsalicylic acid and salicylic acid or the alkaline earth salts thereof, the

amount of said copper coordination compound administered to said animal body being about 0.1 to 500 mg per kilogram of body weight.

4,999,348

LIQUID CRYSTAL CONTAINING COSMETIC AND PHARMACEUTICAL COMPOSITIONS AND METHODS FOR UTILIZING SUCH COMPOSITIONS

Gheorghe Cioca, Lake Grove; James A. Hayward, Port Jefferson; Manuel L. Tan, Glen Cove; Morris Herstein, Scarsdale, all of N.Y., and Walter P. Smith, Stamford, Conn., assignors to Estee Lauder Inc., New York, N.Y.

Filed Dec. 11, 1987, Ser. No. 131,458

Int. Cl.[5] A61K *31/56*

U.S. Cl. 514—171 **11 Claims**

1. A composition comprising vitamin A or a vitamin A containing material, a cholesteric liquid crystal and a translucent or transparent polyacrylic gel carrier, wherein said vitamin A or vitamin A containing material is present in the composition in an amount of about 1% to about 15% by weight of said vitamin A or vitamin A containing material and said cholesteric liquid crystal, and said liquid crystal is present in an amount of about 1% to about 5% by weight of the total composition, said composition providing for the sustained release of the vitamin A or vitamin A containing material into or through the skin of a mammal and for moisturizing and conditioning the skin of said mammal.

4,999,349

BU-4164E - A AND B, PROLYL ENDOPEPTIDASE INHIBITORS

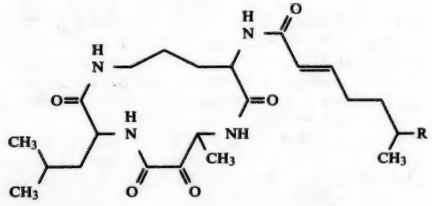
Soichiro Toda, Ohmiya; Yasutaro Hamagishi, Fujisawa; Toshikazu Oki, Yokohama, and Koji Tomita, Tokyo, all of Japan, assignors to Bristol-Myers Squibb Co., New York, N.Y.

Filed Mar. 22, 1990, Ser. No. 497,292

Int. Cl.[5] C12P *17/12;* **A61K** *31/395;* **C07D** *255/02;* **C07K** *5/12;* **C12N** *1/20*

U.S. Cl. 514—183 **5 Claims**

1. A compound having the structure



wherein R is from C_1–C_4 alkyl.

4. A pharmaceutical composition comprising an effective anti-amnestic amount of BU-4164E A or B, or combinations thereof, in combination with an inert pharmaceutically acceptable carrier or diluent.

4,999,350

(RS)-2-(2,3-DIHYDRO-5-HYDROXY-4,6,7-TRIMETHYL-BENZOFURANYL) ACETIC ACIDS AND 2-(2,3-DIHYDRO-5-ACYLOXY-4,6,7-TRIMETHYLBENZOFURANYL) ACETIC ACIDS AND ESTERS THEREOF, USEFUL AS MUCOREGULATOR AND ANTI-ISCHEMIC DRUGS

Mario Brufani, Rome; Stefano Ceccarelli, Frosinone; Patrizia Giannetti, Frosinone; Agnese Paesano, Frosinone; Romolo Scuri, Piacenza, and Sergio Zanarella, Rome, all of Italy, assignors to Biomedica Foscama Industria Chimico-Farmaceutica S.p.A., Rome, Italy

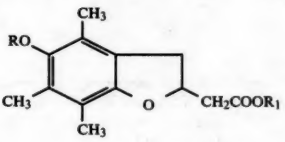
Filed Apr. 13, 1989, Ser. No. 337,358

Claims priority, application Italy, Aug. 1, 1988, 21603 A/88

Int. Cl.[5] A61K *31/34;* **C07D** *307/80*

U.S. Cl. 514—210 **5 Claims**

1. A compound of formula:



(I)

or its pharmaceutically acceptable salts, wherein R is:

hydrogen;

acyl, either linear or branched, with a number of carbon atoms variable from 1 to 7,

hemiacyl of a dicarboxylic acid,

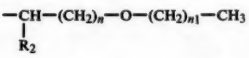
lower alkyl,

R_1 is:

hydrogen,

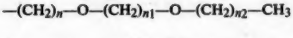
linear or branched alkyl with 2 to 20 carbon atoms,

alkyl either of the type:



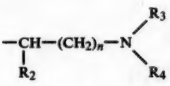
wherein n and n_1 are number variable for 0 to 6 and r_2 is lower alkyl,

alkyl diether of the type:



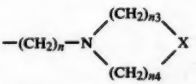
wherein n, n_1 are variable from 1 to 6 and n_2 is a number variable from 0 to 6,

alkylamine of the type:



wherein n is a number variable from 0 to 6, R_2 has the previous meaning and R_3 and R_4 are lower alkyls,

and N-alkylheterocyclic of the type:



wherein X=CH_2,S,O,NR_2;

R_2 has the previous meaning, n is a number variable from 1 to 6 and n_3 and n_4 are numbers variable from 1 to 3.

4,999,351
7-ARYL AND HETEROARYL ETHERS OF DESACETYLFORSKOLIN

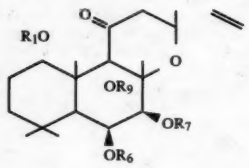
Raymond W. Kosley, Jr., Bridgewater, N.J.; Gerard O'Malley, Newtown, Pa., and Bettina Spahl, Edison, N.J., assignors to Hoechst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

Filed Jan. 11, 1989, Ser. No. 295,840

Int. Cl.[5] A61K *31/35, 31/54;* **C07D** *311/92, 311/78*

U.S. Cl. 514—228.2 **30 Claims**

1. A compound of formula



wherein

R_1 is hydrogen, loweralkyl, arylloweralkyl, a group of formula $R_3R_4R_5Si$, a group of formula R_8CO, or a group of formula $R_{10}R_{11}N(CHR_{12})_nCO$ wherein n is 0 or 1;

R_6 is hydrogen, a group of formula $R_{13}CO$ or a group of formula $R_{14}R_{15}NCO$;

R_7 is phenyl, naphthyl, furanyl, oxazolyl, thiazolyl, pyridinyl, pyrimidinyl, purinyl, quinolinyl, or isoquinolinyl, each of which is unsubstituted or mono- or poly-substituted by loweralkyl, halogen or nitro;

R_9 is hydrogen;

R_3, R_4 and R_5 are the same or not all the same and each is hydrogen or loweralkyl;

R_8 is hydrogen or lower alkyl;

R_{10}, R_{11} and R_{12} are the same or different and each is hydrogen, loweralkyl or arylloweralkyl; or

R_{10} and R_{11} taken together with the nitrogen atom to which they are attached form a group of formula

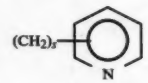
wherein

X is CO, O, S, a group of the formula CHR_{19} or a group of formula NR_{20};

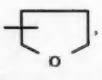
R_{13} is hydrogen or loweralkyl;

R_{14} is hydrogen, loweralkyl, hydroxyloweralkyl, loweralkoxyloweralkyl, or a group of formula $HOCH_2CH(OH)CH_2$;

R_{15} is hydrogen, loweralkyl, hydroxyloweralkyl, loweralkoxyloweralkyl, a group of formula



wherein s is 1 or 2, a group of formula



a group of formula $HOCH_2CH(OH)CH_2$, or a group of formula $(CH_2)_tNR_{21}R_{22}$ wherein t is an integer from 2 to 6;

R_{19} is hydrogen, loweralkyl or OR_{23};

R_{20} is loweralkyl;

R_{21} and R_{22} are the same or different and each is hydrogen or loweralkyl; or

R_{21} and R_{22} taken together with the nitrogen atom to which they are attached form a group of formula

wherein X is as above;

R_{23} is hydrogen or COR_{24};

R_{24} is loweralkyl; and

the optical and geometric isomers thereof, or a pharmaceutically acceptable salt thereof.

4,999,352
1-(1-ARYL-2-HYDROXYETHYL)-IMIDAZOLES AND SALTS THEREOF, MEDICAMENTS CONTAINING THESE COMPOUNDS, AND THE USE THEREOF

Klaus-Dieter Kampe, Bad Soden am Taunus; Patricia Usinger, Eppstein/Taunus; Herbert Siegel, Hofheim am Taunus; Hans G. Alpermann, Königstein/Taunus, and Hermann J. Gerhards, Hofheim am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

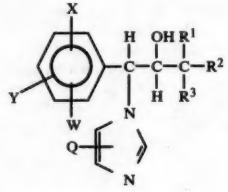
Continuation of Ser. No. 164,135, Mar. 4, 1988, abandoned. This application Nov. 28, 1989, Ser. No. 441,200

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1987, 3707151

Int. Cl.[5] A61K *31/535;* **C07D** *211/06, 233/54, 413/00*

U.S. Cl. 514—235.8 **7 Claims**

1. 1-(1-Aryl-2-hydroxyethyl)-imidazole of the formula I



I

in which

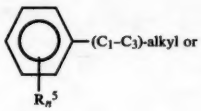
X is H, $(C_1–C_4)$-alkyl, phenyl, F, Cl, Br, I, CF_3, $(C_1–C_4)$-alkoxy, $(C_1–C_4)$-alkylthio, $(C_1–C_4)$-alkoxymethyl, $(C_3–C_5)$-alkenyloxymethyl or $—NR_2^4$, in which the radicals R^4 are identical or different and are $(C_1–C_4)$-alkyl or, together with the nitrogen atom, a pyrrolidine, piperidine or morpholine radical,

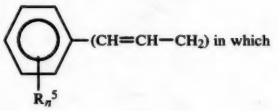
Y is H, $(C_1–C_4)$-alkyl, F, Cl, Br or $((C_1–C_4)$-alkoxy, or

X and Y together in the 3,4-position represent a $—(CH_2)_L$-chain, where L = 3 or 4, $—OCH_2CH_2—$, —O—CH_2O— or —CH=CH—CH=CH—,

W is H, CH_3 or OCH_3,

R^1 is H, $(C_2–C_4)$-alkyl, $(C_2–C_5)$-alkenyl, $(C_2–C_5)$-alkynyl, $(C_3–C_8)$-cycloalkyl, $(C_4–C_8)$-cycloalkenyl, $(C_3–C_7)$—cycloalkyl—CH_2, $(C_4–C_7)$-1-cycloalkenyl-CH_2, $(C_1–C_4)$-alkoxymethyl, $(C_3–C_5)$-alkenyloxymethyl or 2-propyn-1-yloxymethyl,





R^5 is CH_3, C_2H_5, OCH_3, F, Cl, Br or CF_3, and n is 0, 1, or 2 and, in the case where R^5 is CF_3, n is 1,

R^2 is $(C_1–C_4)$-alkyl or $(C_3–C_5)$-alkenyl,

R^3 is $(C_1–C_4)$-alkyl or

R^1 and R^3 or R^2 and R^3, together with the carbon atom to which they are bound are $(C_3–C_7)$-cycloalkyl, C_7-bicycloalkyl, $(C_4–C_7)$-cycloalkenyl or C_7-bicycloalkenyl which is in each case unsubstituted or substituted by 1–3 CH_3 and/or OCH_3 and/or Cl and in which, in cycloalkenyl and bicycloalkenyl radicals, the C=C double bond is in other than the 1-position, or (oxa-C_2–C_5)-cycloalkyl, and

Q is H or CH_3 or C_2H_5 in the 4- and/or 5-position, or the physiologically acceptable acid-addition salt thereof or the steriosomer or optically active enantiomer thereof, excluding those compounds of the formula I in which:

(a) X is cl in 2-position, Y is H or Cl in 4-position, W, Q and R^1 are H, and R^2 and R^3 are methyl;

(b) X is Cl in 2-position, Y is Cl in 4-position, W, Q and R^1 are H, and R^2 and R^3 together with the carbon atom to which they are bound are cyclohexyl or 5-nonbornen-2-yl; or

(c) X is methoxy or Cl in 3-position, Y, W, Q and R^1 and H, and R^2 and R^3 together with the carbon atom to which they are bound are 5-norbornen-2-yl.

6. A process for treating depressive states, wherein an effective amount of a compound of the formula I as claimed in claim 1 is administered to a mammal together with pharmaceutically suitable excipients.

4,999,353

CHEMICAL PROCESS FOR THE PREPARATION OF IMIDAZO-QUINOXALINES AND INTERMEDIATES FOR USE IN THE PROCESS

Frank Wätjen, and Holger C. Hansen, both of Vaerlose, Denmark, assignors to Novo Nordisk A/S, Bagsvaerd, Denmark

Filed Nov. 8, 1989, Ser. No. 433,668

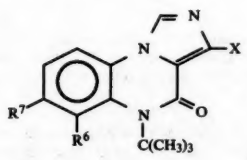
Claims priority, application Denmark, Nov. 10, 1988, 6262/88

The portion of the term of this patent subsequent to Nov. 6, 2007, has been disclaimed.

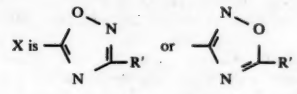
Int. Cl.[5] **C07D** *487/04, 241/44;* **A61K** *31/495;* **C07B** *37/06*

U.S. Cl. 514—250 **6 Claims**

1. A compound having the formula I



wherein



wherein R′ is C_{1-6}-alkyl, C_{3-7}-cycloalkyl, phenyl, thienyl, or C_{1-3}-alkoxymethyl

and wherein R^6 and R^7 independently are hydrogen, halogen or CF_3.

4. A method of treating a patient in need of anticonvulsant or anxiolytic therapy comprising the step of administering to the said patient an effective anxiolytic or anticonvulsant amount of a compound of claim 1.

4,999,354

IMIDAZOQUINOXALINE COMPOUNDS AND THEIR PREPARATION AND USE

Holger C. Hansen, and Frank Wätjen, both of Vaerlose, Denmark, assignors to A/S Ferrosan, Soborg, Denmark

Division of Ser. No. 281,090, Dec. 7, 1988. This application Jan. 3, 1990, Ser. No. 460,310

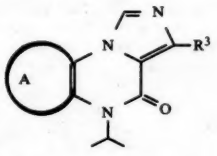
Claims priority, application Denmark, Dec. 8, 1987, 6422/87

The portion of the term of this patent subsequent to Feb. 20, 2007, has been disclaimed.

Int. Cl.[5] **C07D** *487/04, 487/14;* **A61K** *31/505*

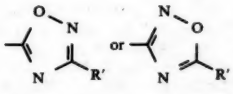
U.S. Cl. 514—250 **6 Claims**

1. Imidazoquinoxaline compounds having the formula I



wherein

R^3 is



wherein

R′ is C_{1-6}-alkyl, C_{3-7}-cycloalkyl or C_{1-6}-alkoxymethyl; and

—A— is

3. A pharmaceutical composition suitable for use in the treatment of a central nervous system ailment associated with the benzodiazepine receptors selected from convulsions and anxiety comprising an amount of a compound of claim 1 which is effective for the alleviation of such disorder together with a pharmaceutically-acceptable carrier or diluent.

4,999,355

ISOINDOLINONE DERIVATIVES, PROCESSES FOR PREPARING THEM AND MEDICINES CONTAINING THEM

Marie-Thérèse Comte, Chevilly Larue; Claude Gueremy, Houilles, and Gérard Ponsinet, Sucy-en-Brie, all of France, assignors to Rhone-Poulenc, Antony, France

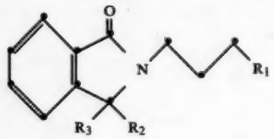
Filed Mar. 6, 1989, Ser. No. 319,302

Claims priority, application France, Mar. 8, 1988, 88 02918

Int. Cl.[5] A61K *31/495, 31/44;* **C07D** *403/06, 401/06*

U.S. Cl. 514—253 **14 Claims**

1. A compound of formula



(I)

in which

either R_1 represents 4-phenyl-1,2,3,6-tetrahydro-1-pyridyl or 4-(4-fluorophenyl)-1,2,3,6-tetrahydro-1-pyridyl, R_2 represents hydrogen, alkoxy of 1 or 2 carbon atoms, hydroxyl, alkyl, alkylthio, alkylcarbonyloxy, phenylalkylcarbonyloxy, phenylalkyl or $—NR_4R_5$ in which R_4 represents hydrogen or alkyl and R_5 represents alkyl, phenyl, monohalogenated phenyl or pyridyl, and R_3 represents hydrogen, or else R_2 represents phenyl and R_3 represents hydrogen or hydroxyl;

or R_1 represents a 4-phenyl-1-piperazinyl radical whose phenyl nucleus is substituted in the 4-position by halogen or hydroxyl, R_2 represents alkoxy and R_3 represents hydrogen;

provided that when R_1 represents 4-phenyl-1,2,3,6-tetrahydro-1-pyridyl, R_2 is not hydroxyl and that unless otherwise stated, the alkyl and alkoxy radicals and the alkyl and alkoxy portions contain 1 to 4 carbon atoms each in a straight or branched chain, and pharmaceutically acceptable addition salts thereof formed with an inorganic or organic acid.

4,999,356

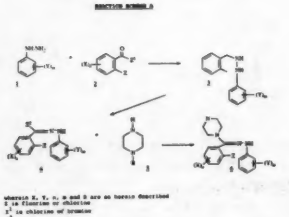
1-PHENYL-3-(1-PIPERAZINYL)-1H-INDAZOLES

Joseph T. Strupczewski, Flemington, N.J., assignor to Hoechst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

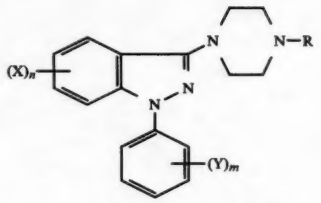
Continuation-in-part of Ser. No. 82,760, Aug. 7, 1987, abandoned. This application Dec. 23, 1988, Ser. No. 289,065

Int. Cl.[5] A61K *31/495;* **C07D** *403/04;* **C07F** *9/6509*

U.S. Cl. 514—254 **142 Claims**

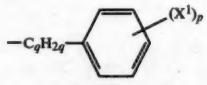


1. A compound of the formula



(I)

wherein n is an integer having a value of 0 or 1; m is an integer having a value of 0 to 2 inclusive; X and Y are independently selected from the group consisting of halogen, loweralkyl, loweralkoxy, loweralkylthio, diloweralkylamino, loweralkylamino, amino, nitro, cyano, mercapto, hydroxy, and trifluoromethyl, wherein for each value of m, Y may be the same or different; and R is selected from the group consisting of hydrogen, loweralkyl, cycloalkylloweralkyl, loweralkenyl, hydroxyloweralkyl, diloweralkylaminoloweralkyl, diloweralkylphosphinylloweralkyl, cyano, loweralkoxycarbonyl, loweralkanoyl, aminocarbonyl, loweralkylaminocarbonyl, and



wherein q is an integer having a value of 0 to 5, inclusive, X^1 is selected from the group consisting of halogen, loweralkyl, loweralkoxy, loweralkylthio, diloweralkylamino, loweralkylamino, amino, nitro, cyano, mercapto, hydroxy and trifluoromethyl, and p is an integer having a value of 0 to 2inclusive, wherein for each value of p, X^1may be the same or different; the term cycloalkyl in each occurrence signifying a cyclic hydrocarbon radical of the formula $—C_xH_{2x-1}$wherein X has a value of 3 to 7 inclusive, the geometrical isomers, optical antipodes or pharmaceutically acceptable acid addition salts thereof.

4,999,357

2-(3-PYRIDYL)-3-(PHENOXY)-PROPANENITRILE DERIVATIVES HAVING FUNGICIDAL ACTIVITY

Alain Gadras, Lyons, and Regis Pepin, Rilleux La Pape, both of France, assignors to Rhone-Poulenc Agrochimie, Lyons, France

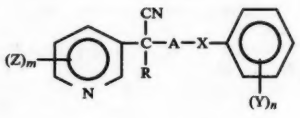
Filed Mar. 20, 1989, Ser. No. 326,004

Claims priority, application France, Mar. 29, 1988, 88 04411

Int. Cl.[5] C07F *7/02;* **C07D** *213/57, 213/78;* **A01N** *43/40*

U.S. Cl. 514—277 **11 Claims**

1. A compound of the formula (I)



(I)

wherein:

A denotes a linear or branched alkylene chain containing at most six carbon atoms, with the proviso that the backbone of the branched alkylene chain contains at least two carbon atoms;

R denotes:

a lower alkyl radical, optionally substituted with one or more substituents selected from the group consisting of halogen atoms, lower alkoxy radicals, lower alkylthio radicals and a radical $—(CH_2)_xSiR_1R_2R_3$, wherein x is

0 or 1 and R_1, R_2 and R_3, which may be identical or different, are lower alkyl, lower alkoxy, phenyl, benzyl or phenethyl;

a 3- to 7- membered cycloalkyl radical selected from the group consisting of cyclopropyl, cyclobutyl, cyclopentyl and cyclohexyl, which is optionally substituted in the same manner as the lower alkyl radical;

a benzyl or phenethyl radical optionally substituted in the same manner as the lower alkyl radical;

a mono- or polyunsaturated lower alkenyl or alkynyl radical, optionally substituted in the same manner as the lower alkyl radical, with the proviso that there is no unsaturation at the alpha-position with respect to the carbon bearing the CN group; and wherein

R is H if A is other than methylene;

X denotes O or S;

Y denotes a halogen atom, a lower alkyl radical, a lower haloalkyl radical, a lower alkoxy radical, a lower haloalkoxy radical, a lower alkylthio radical, a lower haloalkylthio radical, a lower alkoxycarbonyl radical, a lower haloalkoxycarbonyl radical, a lower alkanoyloxy radical, a lower haloalkanoyloxy radical, a phenyl radical, a benzyl or phenethyl radical, a cycloalkyl radical containing 3 to 7 carbon atoms, or a cyano, nitro or hydroxyl radical;

n denotes 0 or a positive integer less than 6, it being possible for the groups Y to be identical or different when n is greater than 1;

Z denotes a lower alkyl or lower alkoxy radical;

m denotes 0, 1 or 2, the groups Z being identical or different when m is 2,

or an agriculturally acceptable salt thereof.

10. A method for treating a crop attacked, or likely to be attacked, by fungus, wherein an effective amount of a compound according to claim **5**, **6**, **7**, **8**, **1**, **2**, **3**, or **4** is applied on the leaves of the crop.

4,999,358

(1,2,3,4-TETRAHYDRO-9-ACRIDINIMINO)CYCLOHEXANE CARBOXYLIC ACID AND RELATED COMPOUNDS

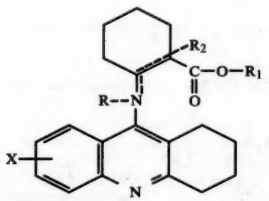
Lawrence L. Martin, Lebanon; Joseph F. Payack, Somerset, and Helen H. Ong, Whippany, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Filed Jun. 26, 1989, Ser. No. 371,228

Int. Cl.[5] C07D *219/10*; A61K *31/47*

U.S. Cl. 514—297 **20 Claims**

1. A compound of the formula



where

X is hydrogen, loweralkyl, loweralkoxy or halogen;

R when present is hydrogen, loweralkyl or arylloweralkyl;

R_1 is hydrogen, loweralkyl or arylloweralkyl; and

R_2 when present is hydrogen or loweralkyl;

the term aryl in each occurrence independently signifying a phenyl group optionally substituted with a loweralkyl, loweralkoxy or halogen group; or a pharmaceutically acceptable acid addition salt thereof.

4,999,359

HETEROCYCLIC ETHYLENE DIAMINE COMPOUNDS AND THEIR PHARMACEUTICAL COMPOSITIONS AND METHODS

Vittorio Vecchietti, and Giuseppe Giardina, both of Milan, Italy, assignors to Dr. Lo Zambeletti S.p.A., Italy

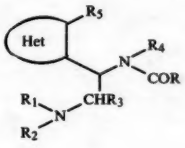
Filed Mar. 14, 1989, Ser. No. 323,617

Claims priority, application United Kingdom, Mar. 16, 1988, 8806210; Oct. 7, 1988, 8823562

Int. Cl.[5] A61K *31/435*; C07D *471/04*

U.S. Cl. 514—301 **10 Claims**

1. A compound, or a solvate or salt thereof, of formula I:



(I)

in which:

R.CO— is an acyl group containing a substituted or unsubstituted carbocyclic aromatic or heterocyclic aromatic group;

R_1 and R_2 are independently hydrogen, C_{1-6} alkyl, C_{2-6} alkenyl, C_{3-6} cycloalkyl or C_{4-12} cycloalkylalkyl groups or together form a C_{2-8} branched or linear polymethylene or C_{2-6} alkenylene group, optionally substituted with a hetero-atom;

R_3 is hydrogen, C_{1-6} alkyl, or phenyl or R_3 together with R_1 form a $—(CH_2)_3—$ or $—(CH_2)_4—$ group;

R_4 and R_5 together form a $—(CH_2)_n—$ group in which n = 1, 2 or 3; and

'Het' is a single ring aromatic heterocyclic group, containing from 5 to 12 ring atoms and comprising up to four heteroatoms in the ring selected from oxygen, nitrogen and sulphur.

4,999,360

METHOD OF INHIBITING VIRUS

George W. J. Fleet; Thomas W. Rademacher, and Raymond A. Dwek, all of Oxford, United Kingdom, assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 136,219, Dec. 21, 1987, abandoned. This application Sep. 26, 1988, Ser. No. 249,144

Int. Cl.[5] A61K *31/445*

U.S. Cl. 514—315 **2 Claims**

1. The method of inhibiting human immunodeficiency virus in a patient infected with said virus comprising administering to said patient a virally inhibitory effective amount to inhibit HIV of a compound selected from the group consisting of

(a) 1,5-dideoxy-1,5-imino-L-fuconolactam,

(b) 1,5-dideoxy-1,5-imino-[N-methyl]-L-fucitol,

(c) 1,5-dideoxy-1,5-imino-[N-ω-methyl caproate]-L-fucitol, and their pharmaceutically acceptable salts.

4,999,361

TRISUBSTITUTED AMINES, PHARMACOLOGICALLY ACCEPTABLE SALTS THEREOF AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Christos Tsaklakidis, Weinheim; Herbert Leinert, Heppenheim, and Peter Freund, Ketsch, all of Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany

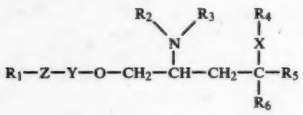
Filed Feb. 27, 1989, Ser. No. 315,769

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1988, 3806321

Int. Cl.[5] A61K *31/40, 31/44;* C07D *207/06*

U.S. Cl. 514—333 16 Claims

1. A compound of the formula:



wherein R_1 is isobutyl, methallyl, isopentenyl, furyl, thienyl, pyridyl, phenyl or phenyl or phenyl substituted by methyl, methoxy or halogen; R_2 and R_3, together with the nitrogen atom to which they are attached, form a pyrrolidine ring; R_4 is phenyl or phenyl substituted by methoxy or halogen; R_5 is pyridyl, phenyl or phenyl substituted by methoxy, methylenedioxy or halogen; R_6 is hydrogen, cyano, methoxycarbonyl, ethoxycarbonyl or hydroxymethyl; X is a valency bond; Y is a valency bond, methylene or ethylene; and Z is a valency bond; or a pharmacologically acceptable salt or optical isomer thereof.

15. A method of producing a blood vessel relaxing effect in a patient in need of such effect, comprising administering to said patient a blood vessel relaxing amount of a compound of claim 1.

4,999,362

2-THIOMETHYL-SUBSTITUTED-1,4-DIHYDROPYRIDINES, METHOD FOR THEIR PREPARATION AND PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

Carmelo A. Gandolfi; Marco Frigerio; Silvano Spinelli; Odoardo Tofanetti, and Sergio Tognella, all of Milan, Italy, assignors to Boehringer Biochemia Robin S.p.A., Milan, Italy

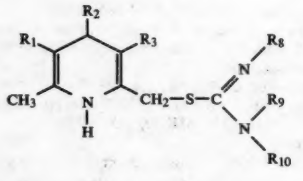
Division of Ser. No. 889,379, Jul. 25, 1986. This application Apr. 4, 1989, Ser. No. 333,080

Claims priority, application Italy, Aug. 6, 1985, 21876 A/85; Jun. 27, 1986, 20965 A/86; Jun. 27, 1986, 20966 A/86

Int. Cl.[5] C07D *401/04, 409/04, 211/86;* A61K *31/455*

U.S. Cl. 514—334 5 Claims

1. Compound of the formula



wherein:

R_1 is a member selected from the group consisting of acetyl, benzoyl, cyano, nitro, free or esterified carboxy group of formula $—CO_2R_5$, and amide of formula $—CONR_6R_7$;

R_2 is a member selected from the group consisting of phenyl, m-nitrophenyl, o-nitrophenyl, p-nitrophenyl, m-methylthiophenyl; m-trifluoromethylphenyl, m-chlorophenyl, 2,3-diclorophenyl, β-pyridyl, α-furanyl, and α-thienyl;

R_3 is a group of formula CO_2R_5;

R_5 is hydrogen, a cation of ammonium or of an alkaline metal, a C_1–C_6 alkyl chain unsubstituted or substituted by hydroxy, amino, monoalkylamino, dialkylamino, or C_1–C_6 alkoxy groups; C_3–C_6 alkenyl; phenyl; or benzyl;

each of R_6 and R_7 is independently selected from the group consisting of hydrogen, C_1–C_6 alkyl, benzyl and phenyl;

R_8, R_9 and R_{10} are independently hydrogen or C_1–C_4 alkyl;

n_1 is an integer from 1 to 6; m is an integer from 1 to 3; p is zero or an integer from 1 to 6; and p_1 is zero or an integer from 1 to 3;

and pharmaceutically acceptable salts, enantiomers, diastereoismoers and diastereomeric mixture of compounds of formula I.

5. A method of producing an anti-hypertensive condition in a patient in need of such condition, said method comprising administering to said patient and antihypertensive effective amount of a compound of claim 1.

4,999,363

TRICYCLIC COMPOUNDS

Etsuo Oshima, Shizuoka; Hiroyuki Obase, Mishima; Akira Karasawa, Shizuoka; Kazuhiro Kubo, Shizuoka; Ichiro Miki, Shizuoka, and Akio Ishii, Shizuoka, all of Japan, assignors to Kyowa Hakko Kogyo Co., Ltd., Tokyo, Japan

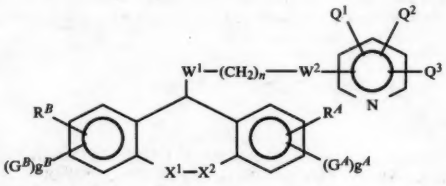
Filed Jun. 6, 1989, Ser. No. 368,242

Claims priority, application Japan, Jun. 9, 1988, 63-142374

Int. Cl.[5] A61K *31/44;* C07D *405/12*

U.S. Cl. 514—332 8 Claims

1. A tricyclic compound of the formula



wherein:

is a single bond or a double bond;

X^1-X^2 is selected from the group consisting of;

$—CH_2—O—$, $—CH_2—S—$, $—CH_2—CH_2—$ and $—CH=CH—$;

G^A and G^B are independently selected from the group consisting of:

lower alkyl, halogen and OR^1, wherein R^1 is hydrogen or lower alkyl;

g^A and g^B are independently 0, 1, 2 or 3;

one of R^A and R^B is hydrogen and the other is $—Y—COOR^{1a}$;

wherein R^{1a} is hydrogen or lower alkyl; and Y is selected from the group consisting of a single bond, $—CR^{1b}—R^{1c}—(CH_2)_m$ and $—CR^{1b}=CR^{1c}—(CH_2)_m—$ and each of R^{1b} and R^{1c} are independently hydrogen or lower alkyl and m is 0, 1, 2, 3 or 4, wherein the left side of Y is bound to the mother nucleus when Y is not a single bond;

W^1 is selected from the group consisting of:

$—S—$, $—SO_2—$, $—O—$, $—NR^{1d}$ wherein R^{1d} is hydrogen or lower alkyl, $—NHCO—$, $=N—$, $=CH—$ and $—CH_2—$; and the left side of W^1 is bound to the mother nucleus when W^1 is $—NHCO—$, $=N—$ or $=CH—$;

n is 0, 1, 2, 3 or 4;

W_2 is selected from the group consisting of a single bond, $—S—$ and $—NR^{1e}—$ wherein R^{1e} is hydrogen or lower alkyl;

Q^1, Q^2, and Q^3 are independently selected from the group consisting of hydrogen, lower alkyl, benzyl, substituted benzyl (wherein each substituent on the phenyl in the substituted benzyl independently represents 1 to 3 groups selected from halogen and OR^{1f}, wherein R^{1f} is hydrogen or lower alkyl; and a substituent on the methylene is $—OR^{1g}$ wherein R^{1g} is hydrogen or lower alkyl), phenyl, halogen, $—CF_3$, nitro, —CN, $—N_3$, $—COOR^2$, $—OR^2$, $—OCOR^2$, $—SR^2$, $—COR^2$, wherein R_2 is hydrogen, straight or branched alkyl having 1 to 18 carbon atoms, benzyl and phenyl $—CONR^{2a}R^{2b}$ (wherein each of R^{2a} and R^{2b} is independently selected from the group consisting of hydrogen, straight or branched C_{1-18} alkyl, benzyl, phenyl) and methylenedioxy formed together with the ortho-position;

and pharmaceutically acceptable salts thereof.

4,999,364
AZOLE DERIVATIVES

Francis T. Boyle, and Zbigniew S. Matusiak, both of Cheshire, England, assignors to Imperial Chemical Industries PLC, London, England

Filed Aug. 7, 1989, Ser. No. 390,245

Claims priority, application United Kingdom, Aug. 8, 1988, 8818791

Int. Cl.[5] C07D *401/10*; A61K *31/44*

U.S. Cl. 514—340 **9 Claims**

1. An azole derivative of the formula

$$R^1—CR^2R^3—CHR^4—CR^5R^6—R^7 \quad (I)$$

wherein R^1 is a 1,2,4-triazolyl radical; R^2 and R^3, which may be the same or different, are each a hydrogen atom or a 1-6 C alkyl radical; R^5 and R^6, which may be the same or different, are each a hydrogen or fluorine atom or a 1-6 C alkyl radical; one of $R^4$and R^7 is a pyridyl radical which is unsubstituted or substituted by one or more substituents selected from halogen atoms, cyano radicals and 1- 4 C halogenoalkyl and halogenoalkoxy radicals, and the other of R^4 and R^7 is a 4-cyanophenyl radical or, for a compound which contains a basic nitrogen atom, a pharmaceutically or veterinarily acceptable salt thereof.

4,999,365
METHOD OF REDUCING REPERFUSION INJURY WITH IMIDAZOL-2-THIONES

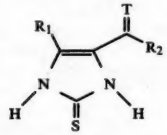
Richard C. Dage, and Richard A. Schnettler, both of Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Continuation of Ser. No. 28,516, Mar. 20, 1987, abandoned. This application Dec. 11, 1989, Ser. No. 449,480

Int. Cl.[5] A61K *31/44, 31/535, 31/495, 31/415*

U.S. Cl. 514—341 **18 Claims**

1. A method of lessening reperfusion injury in a patient suffering from ischemia which comprises administering to the patient a therapeutically effective amount of a compound of the structure:



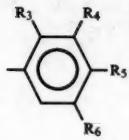
1

wherein

T is a divalent oxygen or sulfur group;

R_1 is a hydrogen or a (C_1–C_4) alkyl group; and

R_2 is a phenyl group of the structure:



wherein R_3, R_4, R_5, and R_6 are each selected from a hydrogen, (C_1–C_4)alkyl, (C_1–C_4) alkoxy, (C_1–C_4)alkylthio, (C_1–C_4)-alkylsulfoxide, (C_1–C_4)alkylsulfone, hydroxy, halogen, trifluoromethyl, —NR′R″ wherein R′ and R″ are each selected from a hydrogen or (C_1–C_4)alkyl group, pyrrolidino, piperidino, morpholino, piperazino, N—(C_1–C_4)-alkylpiperazino, cyano, carboxy, carboxamido, C_1–C_4)-alkoxycarbonyl, amidino, and 1-, 2-, 3-, 4-, or 5-imidazolyl, and any two adjacent R_3, R_4, R_5, and R_6 groups can taken together form a methylenedioxy group and with the proviso that when one of R_3, R_4, R_5, or R_6 is a —NR′R″, pyrrolidino, piperidino, morpholino, piperazino, or N—(C_1–C_4)alkylpiperazino group then at least two of R_3, R_4, R_5, and R_6 must be a hydrogen group; or

R_2 is a pyridyl group optionally having one or two substituents selected from (C_1–C_4)alkyl, (C_1–C_4)alkoxy, (C_1–C_4)alkylthio, (C_1–C_4)alkylsulfoxide, (C_1–C_4)alkylsulfone, trifluoromethyl, cyano, carboxy, carboxamido, amidino, and 1-, 2-, 3-, 4-, or 5-imidazolyl; or

R_2 is a 2- or 3-(1H)-pyrryl, 2- or 3-thienyl, or 2- or 3-furanyl; or

a pharmaceutically acceptable salt thereof.

4,999,366
ISOXAZOLIDINE-3,5-DIONES, PHARMACEUTICAL COMPOSITIONS AND METHOD OF TREATMENT

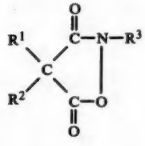
Robert A. Izydore, Durham, and Iris H. Hall, Chapel Hill, both of N.C., assignors to The North Carolina Central Univ., Duham and The Univ. of North Carolina at Chapel Hill, Chapel Hill, both of, N.C.

Division of Ser. No. 264,695, Oct. 31, 1988, Pat. No. 4,946,963. This application Mar. 12, 1990, Ser. No. 491,816

Int. Cl.[5] C07C *103/30*

U.S. Cl. 514—380 **19 Claims**

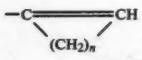
1. A method of controlling hyperlipidemia in mammals which comprises administering to a mammal an amount effective to control hyperlipidemia of an compound having hypolipidemic activity and the structural formula



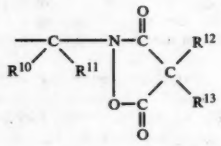
wherein R^1 and R^2, which may be the same or different provided both are not hydrogen when R^3 is an alkenyl or cycloalkenyl group, are selected from the group consisting of hydrogen; alkyl of 1 to 18 carbons; substituted alkyl of 1 to 18 carbons; cycloalkyl of 4 to 10 ring carbon atoms substituted cycloalkyl of 4 to 10 ring carbon atoms; alkoxy of 1 to 8 carbon atoms; amido; carbamoyl; acyloxy; alkoxycarbonyl; halogen; aryl and substituted aryl; or together R^1 and R^2 form a C_3 to C_7 alkylene group; and

R^3 is hydrogen; lower alkyl; substituted lower alkyl; cycloalkyl; substituted cycloalkyl; aryl; substituted aryl; a group —COR^4 where R^4 is hydrogen, lower alkyl, substituted lower alkyl, cycloalkyl, substituted cycloalkyl, aryl, or substituted aryl; a group —$CONHR^5$ where R^5 has the same meaning as R^4; an alkoxycarbonyl group —CO_2R^6

where R^6 has the same meaning as R^4; an alkenyl group $—CR^7{=}CR^8R^9$ where R^7, R^8 and R^9, which may be the same or different, have the same meaning as R^4; a cycloalkenyl group



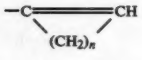
where n is an integer from 3 to 8; or a group



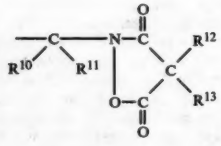
where R^{10} and R^{11} have the same meanings as R^4 or together R^{10} and R^{11} form a C_3 to C_7 alkylene group, and R^{12} and R^{13}, which may be the same or different, have the same meanings as R^1 and R^2, provided that R^1 and R^2 are not both hydrogen, the pharmaceutically acceptable salts, and mixtures thereof.

10. A pharmaceutical composition for use in controlling hyperlipidemia in mammals which comprises a pharmaceutically acceptable carrier and a hypolipidemically effective amount of a compound having hypolipidemic activity and a structural formula as defined in claim **1** wherein

R^3 is a group $—COR^4$ where R^4 is hydrogen, lower alkyl, substituted lower alkyl, cycloalkyl, substituted cycloalkyl, aryl, or substituted aryl; a group $—CONHR^5$ where R^5 has the same meaning as R^4; an alkoxycarbonyl group $—CO_2R^6$ where R^6 has the same meaning as R^4; an alkenyl group $—CR^7{=}CR^8R^9$ where R^7, R^8 and R^9, which may be the same or different, have the same meaning as R^4; a cycloalkenyl group



where n is an integer from 3 to 8; or a group



where R^{10} and R^{11} have the same meanings as R^4 or together R^{10} and R^{11} form a C_3 to C_7 alkylene group, and R^{12} and R^{13}, which may be the same or different, have the same meanings as R^1 and R^2, provided that R^1 and R^2 are not both hydrogen, the pharmaceutically acceptable salts, and mixtures thereof.

4,999,367

ETHERS OF 1-BENZYL-3-HYDROXYMETHYL-INDAZOLE WITH ALIPHATIC 2-HYDROXYACIDS, COMPOSITIONS AND USE

Leandro Baiocchi, and Bruno Silvestrini, both of Rome, Italy, assignors to Aziende Chimiche Ruinite Angelini Francesco A. C. R. A. F. S. p. A., Rome, Italy

Filed Jan. 24, 1990, Ser. No. 470,118

Claims priority, application Italy, Feb. 7, 1989, 47620 A/89

Int. Cl.[5] **A61K** *31/415;* **C07D** *231/56*

U.S. Cl. 514—403 **4 Claims**

1. A compound of the formula

$$A—CH_2—O—CRR'—COOR''' \quad (I)$$

where A is a 1-benzyl-indazol-3-yl nucleus, R and R′ may be the same or different and are H or C_1–C_5 alkyl, R‴ is H or the residue of an aliphatic saturated alcohol having from 1 to 4 carbon atoms;

and, when R‴ is H, the salts thereof with pharmaceutically acceptable bases.

4. A method of treatment comprising administering to a patient in need of an analgesic an effective amount of a compound of formula

$$A—CH_2—O—CRR'—COOR''' \quad (II)$$

where A is a 1-benzyl-indazol-3-yl nucleus, R and R′ may be the same or different and are H or C_1–C_5 alkyl, R‴ is H or the residue of an aliphatic saturated alcohol having from 1 to 4 carbon atoms;

or, when R‴ is H, or a pharmaceutically acceptable salt thereof with a pharmaceutically acceptable base.

4,999,368

SELECTIVE PYRAZOLINE INSECTICIDES AND FUNGICIDES, COMPOSITIONS AND USE

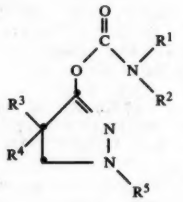
John J. Delany, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 12, 1990, Ser. No. 478,881

Int. Cl.[5] **A61K** *43/56;* **C07D** *231/08*

U.S. Cl. 514—403 **19 Claims**

1. A compound having the structure:



wherein:

R^1 and R^2 are selected independently from a group consisting of hydrogen, with the proviso that only one of R^1 and R^2 can be hydrogen and alkyl of from 1–20 carbon atoms;

R^3 and R^4 are selected independently from a group consisting of hydrogen and alkyl of from 1–20 carbon atoms;

R^5 is selected from a group consisting of alkyl of 1–10 carbon atoms, alkenyl of 1–10 carbon atoms and substituted or unsubstituted aryl of 6–20 carbon atoms wherein the substituents are selected from alkyl, halogen, nitro and methylsulfonyl.

9. An insecticidal composition comprising an insecticidally effective amount of a compound according to claim **1** and one or more suitable carriers.

15. A fungicidal composition comprising a fungicidally

effective amount of a compound according to claim 1 and one or more suitable carriers.

4,999,369

TETRACYCLIC HETEROCYCLIC DERIVATIVES, PHARMACEUTICAL COMPOSITIONS AND USE

Kenneth W. Bair, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Division of Ser. No. 49,282, May 12, 1987, Pat. No. 4,910,218, which is a continuation-in-part of Ser. No. 801,087, Nov. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 673,356, Nov. 20, 1984, abandoned. This application Feb. 15, 1990, Ser. No. 480,320

Claims priority, application United Kingdom, May 14, 1986, 8611762

Int. Cl.[5] A61K *31/40;* **C07D** *491/048, 487/04, 495/04*

U.S. Cl. 514—410 **7 Claims**

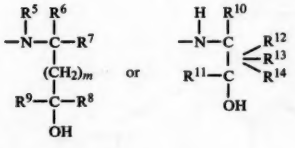
1. A compound of formula (I)

$$ArCH_2R^1 \quad (I)$$

or a pharmaceutically acceptable acid addition salt thereof;

wherein Ar is a fused tetracyclic aromatic ring system comprised of 5-membered heterocyclic rings and 6-membered carbocyclic rings and contains two heteroatoms, at least one of said heterocyclic rings containing a nitrogen atom and a total of no more than 18 ring atoms, or a substituted derivative thereof; wherein the heteroatom is oxygen, sulfur or nitrogen; when it is nitrogen it is substituted by hydrogen, methyl or ethyl; the ring system also optionally substituted by one or two substituents selected from halogen; cyano; C_{1-4} alkyl or C_{1-4} alkoxy, each optionally substituted by hydroxy or C_{1-2} alkoxy; halogen-substituted C_{1-2} alkyl or C_{1-2} alkoxy; a group $S(0)_nR^2$ wherein n is an integer 0, 1 or 2 and R^2 is C_{1-2} alkyl optionally substituted by hydroxy or C_{1-2} alkoxy; or the heterocyclic ring is optionally substituted by a group NR^3R^4 containing not more than 5 carbon atoms wherein R^3 and R^4 are the same or different and each is a C_{1-3} alkyl group;

R^1 contains not more than eight carbon atoms and is a group



wherein m is 0 or 1;

R^5 is hydrogen;

R^6 and R^7 are the same or different and each is hydrogen or C_{1-5} alkyl optionally substituted by hydroxy;

R^8 and R^9 are the same or different and each is hydrogen or C_{1-3} alkyl;

is a five- or six-membered saturated carbocyclic ring;

R^{10} is hydrogen, methyl or hydroxymethyl;

R^{11}, R^{12} and R^{13} are the same or different and each is hydrogen or methyl;

R^{14} is hydrogen, methyl, hydroxy, or hydroxymethyl.

6. A method for reducing the number of cells of a solid or ascitic tumor susceptible to such reduction in a mammal bearing said tumor comprising the administration to said mammal of an effective tumor cell reducing amount of a compound or salt of claim 1, 2, 3, 4, or 5.

4,999,370

COMPOUNDS WITH A PSYCHOTROPIC ACTION, AGENTS CONTAINING THEM, AND THE USE THEREOF FOR THE TREATMENT AND PROPHYLAXIS OF DISORDERS OF THE CENTRAL NERVOUS SYSTEM

Wolfgang Rüger, Kelkheim; Hansjörg Urbach, Kronberg/Taunus; Rainer Henning, Hattersheim am Main; Jens Stechl, Frankfurt am Main; Patricia Usinger, Eppstein/Taunus, and Franz Hock, Dieburg, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

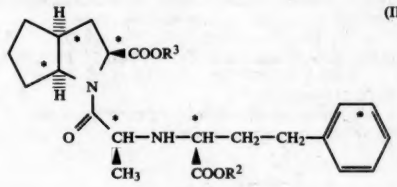
Filed Jan. 25, 1989, Ser. No. 301,297

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1988, 3802303; Jan. 30, 1988, 3802760; Apr. 22, 1988, 3813819

Int. Cl.[5] C07D *209/02;* **A61K** *31/40*

U.S. Cl. 514—412 **6 Claims**

1. A compound of the formula III



(III)

in which the five chiral carbon atoms (*) each have the S configuration,

R^2 denotes ethyl or hydrogen, and

R^3 denotes n-octyl, or a physiologically tolerated salt thereof.

6. A pharmaceutical agent comprising a nootropically effective amount of a compound as claimed in claim 1, or the physiologically tolerated salt thereof, and a physiologically tolerated vehicle.

4,999,371

SUBSTITUTED 3,4-DIHYDRO-2H-BENZOPYRANS, PROCESSES FOR THEIR PREPARATION, THEIR USE AND PHARMACEUTICAL PRODUCTS BASED ON THESE COMPOUNDS

Heinrich C. Englert; Hans-Jochen Lang, both of Hofheim am Taunus; Dieter Mania, and Bernward Schölkens, both of Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

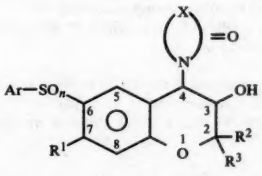
Filed Feb. 2, 1988, Ser. No. 151,584

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1987, 3703227

Int. Cl.[5] C07D *405/04;* **A61K** *31/40, 31/435, 31/55*

U.S. Cl. 514—422 **9 Claims**

1. A 3,4-dihydro-2-benzo[b]pyran of the formula I



I

in which

R^1 is H, OH, $(C_1–C_2)$-alkoxy, $(C_1–C_2)$-alkyl or NR^4R^5, R^4 and R^5 being identical or different and representing H, $(C_1–C_2)$-alkyl or $(C_1–C_3)$-alkylcarbonyl,

R^2 and R^3 are identical or different and are alkyl having 1–4 carbon atoms,

Ar is phenyl which is unsubstituted or substituted by 1 to 3 identical or different radicals selected from the group consisting of $(C_1–C_2)$-alkyl, $(C_1–C_2)$-alkoxy, halogen, trifluoromethyl, CN, NO_2, CO-$(C_1–C_2)$-alkyl and SO_m-$(C_1–C_2)$-alkyl with m=1 or 2,

n is 1 or 2 and

X is a $(CH_2)_r$ chain and r being the numbers 3, 4 or 5.

7. A method for treating hypertension, angina pectoris or cardiac insufficiency in a mammal which comprises administering an effective amount for said treatment of a compound of the formula I as claimed in claim 1.

4,999,372

NEW AMINOCHROMANOL COMPOUNDS

Gilbert Regnier, Chatenay Malabry; Alain Dhainaut, Chatou; Jean-Paul Vilaine, Chatenay Malabry; Nicole Villeneuve, Rueil Malmaison; Ghislaine Joly, Neuilly s/Seine, and Jacques Duhault, Croissy s/Seine, all of France, assignors to ADIR et Compagnie, Neuilly-sur-Seine, France

Filed Oct. 11, 1989, Ser. No. 419,824

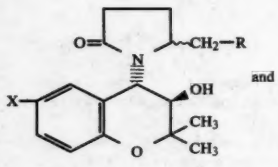
Claims priority, application France, Oct. 17, 1988, 88 13637

Int. Cl.[5] C07D *405/04; A61K 31/35, 31/40*

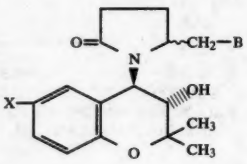
U.S. Cl. 514—422 **8 Claims**

1. A compound selected from the group consisting of: amino chromanol compounds of formula I:

(I)



and



in which:

X is selected from the group consisting of: cyano, nitro, trifluoromethyl, alkoxycarbonyl in which the alkoxy group contains 1 to 5 carbon atoms, carbamido, dialkylcarbamido, aminosulfonyl, dialkylaminosulfonyl, alkylsulfonyl and alkylsulfonylamino in which the alkyl groups each contain 1 to 5 carbon atoms, and acyl selected from: acetyl, propionyl, benzoyl and trifluoroacetyl;

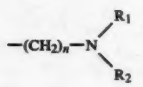
CH_2-R is attached (in the 5 position of the pyrrolidinone nucleus) to an R- or S- configured carbon atom, and R is selected from the group consisting of:

(a) —OR′ and —SR′ radicals in which R′ is selected from the group consisting of:

hydrogen;

alkyl and hydroxyalkyl having up to 10 carbon atoms, and such radical interrupted by an oxygen atom;

alkylcarbonyl in which alkyl contains up to 5 carbon atoms;



in which:

n is an integer from 2 to 5, and R_1 and R_2, which are identical or different, are each selected from the group consisting of:

hydrogen,

alkyl having 1 to 5 carbon atoms, and

(b)

in which R_1 and R_2 have the meanings given above, and physiologically-tolerable acid addition salts of the compounds of the formula I wherein R contains a basic function.

4,999,373

ANTIHYPERLIPIDEMIC AND ANTIATHEROSCLEROTIC COMPOUNDS AND COMPOSITIONS

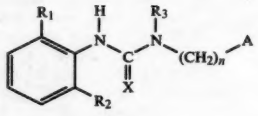
Bharat K. Trivedi, Canton, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 364,349, Jun. 9, 1989, Pat. No. 4,948,806, which is a division of Ser. No. 176,080, Mar. 30, 1988, Pat. No. 4,868,210. This application Feb. 9, 1990, Ser. No. 478,296

Int. Cl.[5] A01N *43/14, 43/16;* **C07D** *335/08, 311/82*

U.S. Cl. 514—437 **5 Claims**

1. A compound having the formula



wherein

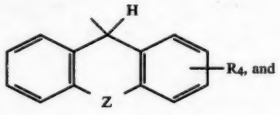
R_1 and R_2 are independently selected from alkyl or alkoxy of from one to six carbon atoms;

R_3 is hydrogen, alkyl of from one to seven carbon atoms, or phenylmethyl;

X is oxygen or sulfur;

n is zero, one or two;

A is selected from



Z is

>O, or

>S;

R_4 is selected from

hydrogen

alkyl of from one to six carbon atoms,

hydroxy,

acetoxy,

alkoxy of from one to six carbon atoms,

phenoxy,

fluorine,

chlorine,

bromine,

nitro,

trifluoromethyl,

carboxyl,

—COO—alkyl in which the alkyl portion contains from one to four carbon atoms,

amino,

alkylamino of from one to six carbon atoms,
dialkylamino in which the alkyl groups contain from one to six carbon atoms,
—NH—acetyl; or
a pharmaceutically acceptable salt thereof.

4. A method of treating hypercholesterolemia or atherosclerosis comprising administering to a mammal in need of such treatment an ACAT-inhibitory effective amount of a compound as defined by claim 1.

4,999,374

VETERINARY TREATMENT

Lincoln Dassanayake, 15, Limes Avenue, Aylesbury, Buckinghamshire, England

Filed Nov. 14, 1988, Ser. No. 270,002
Claims priority, application United Kingdom, Nov. 11, 1987, 8726384
Int. Cl.[5] A61K *31/35*
U.S. Cl. 514—451 3 Claims

1. A method of combatting a *Treponema hyodysenteriae* infection in a pig having said infection comprising orally administering to a pig having said infection an effective infection combatting amount of tetronasin or physiologically acceptable salt thereof.

4,999,375

PSORALEN REAGENT COMPOSITIONS FOR EXTRACORPOREAL TREATMENT OF BLOOD

Maria O. Bachynsky, Nutley; Martin H. Infeld, Upper Montclair; Richard J. Margolis, and Dennis A. Perla, both of Wayne, all of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 11, 1989, Ser. No. 336,179
Int. Cl.[5] A61K *31/35*
U.S. Cl. 514—455 31 Claims

1. A reagent composition for extracorporeal administration to blood prior to reinfusion into a subject, said composition comprising a sterile aqueous solution of about 0.005 mg/ml to about 1 mg/ml of a psoralen, ethyl alcohol, propylene glycol and water, said composition having a pH from about 2.0 to about 5.5.

4,999,376

PHARMACEUTICAL COMPOSITION FOR TREATING AND PREVENTING CARDIOVASULAR DISEASE

Yaguang Liu, 30 Seaman Ave., New York, N.Y. 10034

Division of Ser. No. 910,240, Sep. 22, 1986, Pat. No. 4,906,470.
This application Dec. 13, 1989, Ser. No. 449,747
Int. Cl.[5] A61K *31/335, 31/045*
U.S. Cl. 514—468 4 Claims

1. A process for producing Danshensu comprising:
a. extracting ground roots of a plant selected from the group consisting of *Salvia miltiorrhiza* Bunge, *Salvia przewalskii* Maxim and *Salvia trijuga* Diels with boiling water;
b. concentrating the aqueous extract under reduced pressure;
c. adding a sufficent amount of 95% ethanol to the concentrated extract to form an extract containing 75% of ethanol and collecting the ethanol extract;
d. concentrating the ethanol extract under reduced pressure to yield a residue;
e. alternately extracting the residue of step d with an equal amount of water and then with an equal amount of ethanol;
f. concentrating the resulting combined extracts of step e under reduced pressure; and
g. crystallizing Danshensu at 4 degrees C.

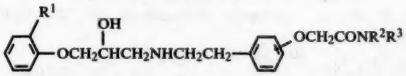
4,999,377

CHEMICAL COMPOUNDS

Peter W. R. Caulkett, Macclesfield; Michael J. Cooper, Congleton; Murdoch Eakin, and Geraint Jones, both of Macclesfield, all of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Jan. 19, 1989, Ser. No. 298,752
Claims priority, application United Kingdom, Jan. 21, 1988, 8801306
Int. Cl.[5] A61K *31/275, 31/16;* C07C *255/50, 233/05*
U.S. Cl. 514—507 12 Claims

1. A compound of the formula (I):



(I)

wherein:
R^1 is hydrogen; fluoro or chloro;
R^2 is hydrogen; C_{1-6} alkyl; C_{1-6} alkyl substituted by a group selected from hydroxy, C_{1-4} alkoxy, phenoxy, carbamoyl, C_{1-6} alkylcarbamoyl, di-C_{1-6} alkylcarbamoyl, phenyl and chlorophenyl; C_{3-6} alkenyl; C_{3-6} alkenyl substituted by a group selected from hydroxy, C_{1-4} alkoxy, phenoxy, carbamoyl, C_{1-6} alkylcarbamoyl, di-C_{1-6} alkylcarbamoyl, phenyl and chlorophenyl; C_{3-6} alkynyl; C_{3-5} cycloalkyl; phenyl or phenyl substituted by a radical selected from halo, C_{1-4} alkyl, C_{1-4} alkoxy, trifluoromethyl, cyano and nitro;
R^3 is hydrogen; C_{1-6} alkyl; or is a group —OR^4 wherein R^4 is hydrogen; C_{1-6} alkyl; C_{1-6} alkyl substituted by hydroxy; C_{1-6} alkyl substituted by C_{1-4} alkoxy; C_{3-6} alkenyl; C_{3-6} alkenyl substituted by hydroxy; C_{3-6} alkenyl substituted by C_{1-4} alkoxy; or R^4 is C_{3-6} alkynyl, phenyl, naphthyl, phenyl C_{1-4} alkyl or naphthyl C_{1-4} alkyl;
or a pharmaceutically acceptable salt thereof.

10. A pharmaceutical composition which comprises a compound according to claim 1 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable carrier.

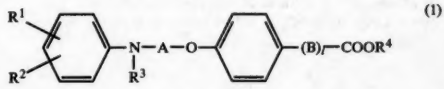
4,999,378

PHENYLCARBOXYLIC ACID DERIVATIVES

Setsuro Fujii, Kyoto; Hiroyuki Kawamura, and Shinichi Watanabe, both of Otsu, all of Japan, assignors to Otsuka Pharmaceutical Company, Limited, Tokyo, Japan

Filed Jun. 20, 1989, Ser. No. 372,336
Claims priority, application Japan, Oct. 20, 1987, 62-264744; Feb. 26, 1988, 63-45399
Int. Cl.[5] A61K *31/195*
U.S. Cl. 514—567 10 Claims

1. A compound of the formula



(I)

wherein R^1 and R^2 are each hydrogen atom, a halogen atom, a C_1–C_6 alkyl group, a C_1–C_6 alkyl group having a halogen atom, a C_3–C_8 cycloalkyl group, a nitro group, a C_1–C_6 alkoxy group, of a phenoxy group having a substituent of a halogen atom, or both groups R^1 and R^2 form a C_1–C_4 alkylenedioxy group which bond to adjacent carbon atoms;
R^3 is hydrogen atom, a C_1–C_6 alkyl group which may be substituted by a carboxyl group, or a C_2–C_6 alkenyl group;
R^4 is hydrogen atom or a C_1–C_6 alkyl group;
A is a C_1–C_6 alkylene group or a C_2–C_6 alkenylene group;
B is a C_1–C_6 alkylene group or a C_2–C_6 alkenylene group;
l is 0 or 1,

or a pharmaceutically acceptable salt thereof.

10. A method for the treatment of hyperlipidemia which comprises administering an effective hypolipidemic amount of a compound or salt as defined in claim 1 to a patient in need thereof.

4,999,379

NOVEL PHARMACEUTICAL COMPOSITIONS FOR TOPICAL APPLICATION WITH SYSTEMIC ACTION

Peter Fankhauser, Ettingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 63,889, Jun. 19, 1987, abandoned. This application May 5, 1989, Ser. No. 348,325

Claims priority, application Switzerland, Jun. 27, 1986, 2597/86

Int. Cl.[5] A61K *31/195*

U.S. Cl. 514—567 **3 Claims**

1. A transdermal therapeutic system containing a pharmaceutical composition for systemic administration of diclofenac consisting essentially of

(a) an antirheumatically and antiphlogistically effective amount of diclofenac or a pharmaceutically acceptable salt thereof,

(b) N,N-dimethyllauroylamide or 1-n-dodecylazacycloheptan-2-one, in a concentration which enhances the skin permeability of component (a), and

(c) further excipients suitable for percutaneous delivery.

4,999,380

TREATMENT OF LIPOPROTEIN DISORDERS ASSOCIATED WITH CHOLESTEROL METABOLISM

Manfred Berger, Vienna, Austria; Daniele Spielmann, Lausanne, and Helmut Traitler, Corseaux, both of Switzerland, assignors to Nestec S.A., Vevey, Switzerland

Filed Oct. 18, 1988, Ser. No. 259,156

Int. Cl.[5] A61K *31/70*

U.S. Cl. 514—558 **5 Claims**

1. A method for treatment of lipoprotein disorders associated with cholesterol metabolism comprising administering blackcurrant lipid to humans having such disorders in an amount effective for, over time, increasing CHDL and reducing CLDL levels in the humans.

4,999,381

FUNGICIDES

Patrick J. Crowley, Crowthorne; Alasdair T. Glen, Macclesfield, and Rosamund A. Spence, Caversham, all of England, assignors to Imperial Chemical Industries PLC, London, England

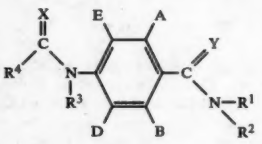
Filed Feb. 2, 1990, Ser. No. 473,677

Claims priority, application United Kingdom, Feb. 2, 1989, 8902323; Oct. 17, 1989, 8923366

Int. Cl.[5] A01N *37/24, 37/22*

U.S. Cl. 514—618 **8 Claims**

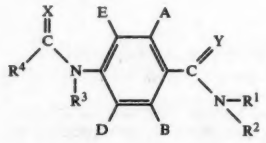
1. A method of combating fungi which comprises applying to plants or to the locus of the plants a fungicidally effective amount of a fungicidally active compound of the formula (I):



(I)

in which A and B are independently H, fluoro, chloro, bromo, C_{1-4} alkyl, C_{1-4} alkoxy or halo(C_{1-4}) alkyl provided that both are not H; D and E are independently H or fluoro; R′ is H, C_{1-4} alkyl or C_{1-4} alkoxy; R^2 is C_{1-4} alkyl, C_{1-4} alkoxy or optionally substituted phenyl, R^3 is H; R^4 is trichloromethyl, C_{2-8} alkyl optionally substituted with halogen, C_{1-8} alkoxy or $R'S(O)_n$ in which R′ is C_{1-4} alkyl, C_{2-4} alkenyl or C_{2-4} alkynyl and n is 0, 1 or 2, cyclopropyl optionally substituted with halogen or C_{1-4} alkyl, C_{2-8} alkenyl, C_{2-8} alkynyl, C_{2-8} alkoxy, mono- or di(C_{1-4})alkylamino; and X and Y are independently oxygen or sulphur.

8. A method of combating fungi selected from the group consisting of *Phytophthora infestans* and *Plasmopara viticola* which comprises applying to plants or to the locus of the plants, a fungicidally effective amount of a fungicidally active compound of the formula (I):



(I)

in which A and B are independently H, fluoro, chloro, bromo, C_{1-4} alkyl, C_{1-4} alkoxy or halo(C_{1-4})alkyl provided that both are not H; D and E are independently H or fluoro; R^1 is H, C_{1-4} alkyl or C_{1-4} alkoxy; R^2 is C_{1-4} alkyl, C_{1-4} alkoxy or optionally substituted phenyl, R^3 is H; R^4 is trichloromethyl, C_{2-8} alkyl optionally substituted with halogen, C_{1-8} alkoxy or $R'S(O)_n$ in which R′ is C_{1-4} alkyl, C_{2-4} alkenyl or C_{2-4} alkynyl and n is 0, 1 or 2, cyclopropyl optionally substituted with halogen or C_{1-4} alkyl, C_{2-8} alkenyl, C_{2-8} alkynyl, C_{2-8} alkoxy, mono- or di(C_{1-4})alkylamino; and X and Y are independently oxygen or sulphur.

4,999,382

COMPOSITIONS FOR TREATING TOBACCO WITHDRAWAL SYMPTOMS AND METHODS FOR THEIR USE

Richard J. Wurtman; Judith J. Wurtman, both of Boston, Mass., and Bonnie Spring, Chicago, Ill., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Oct. 26, 1988, Ser. No. 262,625

Int. Cl.[5] A61K *31/135*

U.S. Cl. 514—646 **3 Claims**

1. A method of treating disturbances of mood, disturbances of appetite or disturbances which contribute to recidivism associated with nicotine withdrawal comprising administering to a human experiencing symptoms of nicotine withdrawal an effective quantity of a drug which selectively enhances serotonin-mediated neurotransmission selected from the group consisting of d-fenfluramine, d,l-fenfluramine, d-norfenfluramine, d,l-norfenfluramine and fluoxetine.

4,999,383

PROCESS FOR THE PRODUCTION OF FLAME-RETARDANT POLYURETHANE PRODUCTS

David H. Blount, 6728 Del Cerro Blvd., San Diego, Calif. 92120

Filed Jul. 17, 1989, Ser. No. 380,660

Int. Cl.[5] C08G *18/14*

U.S. Cl. 521—103 **28 Claims**

1. The process of preparing flame retardant polyurethane products by mixing and reacting:

(A) acidic boron compound, in the amount of 1 to 100 parts by weight;

(B) salt-forming basic compound utilized to adjust the pH of the reaction mixture to above 6 selected from the group consisting of metal containing compounds, ammonium-containing compounds and mixtures thereof, except for salts of acids stronger than boric acid, in the amount of 1 to 200 parts by weight;

(C) compound containing one or more active hydrogen that will react a polyisocyanate compound, in the amount of 1 to 200 parts by weight:

(D) organic polyisocyanate, in the amount of 1 to 200 parts by weight.

4,999,384

FOAMED BLENDS OF NYLON 6,I/T AND POLYCARBONATE

Daniel L. Roberts, Albany, N.Y., and G. Fred Willard, Dalton, Mass., assignors to General Electric Company, Pittsfield, Mass.

Filed Aug. 14, 1990, Ser. No. 567,412
Int. Cl.[5] C08J 9/14
U.S. Cl. 521—134 6 Claims

1. A rigid foam article comprising:

(a) a cellular matrix derived from a blend composition comprising an aromatic polycarbonate resin and a polyamide resin, said polyamide resin being derived from 1,6-hexamethylenediamine, isophthalic acid and terephthalic acid.

4,999,385

CARBONACEOUS FOAMS

Francis P. McCullough, Jr., Lake Jackson, Tex.; David M. Hall, Auburn, Ala.; William G. Stobby, Johntown, and Kyung W. Suh, Granville, both of Ohio, assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 379,520, Jul. 13, 1989, abandoned, which is a division of Ser. No. 285,141, Dec. 16, 1988, abandoned. This application Feb. 6, 1990, Ser. No. 475,592
Int. Cl.[5] C08F 36/00; B01J 20/26
U.S. Cl. 521—149 14 Claims

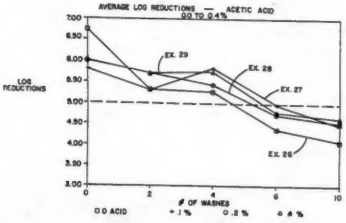
1. A non-flammable foam from an acrylonitrile based polymer containing at least 85% acrylonitrile structure which comprises a non-graphitic carbonaceous foam having a nitrogen content of at least 5%, a specific resistivity greater than 10^1 ohm-cm, and an LOI value greater than 40.

4,999,386

DISINFECTANT POLYMERIC COATINGS FROM ESTERS OF α,β-UNSATURATED CARBOXYLIC ACID AND GERMICIDE

Thomas R. Oakes, Stillwater; Daniel E. Pedersen, Cottage Grove, and Donna M. Majewski, Lino Lakes, all of Minn., assignors to Ecolab Inc., St. Paul, Minn.

Division of Ser. No. 303,009, Jan. 30, 1989, Pat. No. 4,883,828, which is a continuation of Ser. No. 48,800, May 12, 1987, abandoned. This application Nov. 16, 1988, Ser. No. 272,108
Int. Cl.[5] C08K 5/19, 5/13
U.S. Cl. 523—122 28 Claims



1. A liquid antimicrobial film-forming composition free of complexed inorganic metal salt, said composition comprising a solution in an aqueous solvent of (i) an amount of a germicidal agent effective to impart prolonged antimicrobial properties and (ii) a film-forming, water soluble copolymer, said copolymer comprising:

(a) about 50 to 99.5 mol-% of said copolymer of a monomer having an alpha, beta unsaturated carboxylic acid hydroxy alkyl ester hydrophilic functional group;

(b) about 0.5 to 50 mol-% of said copolymer of a monomer selected from the group consisting of an aromatic ester, a cycloalkyl ester, or an ester mixture thereof of an alpha, beta-unsaturated carboxylic acid; and

(c) about 0.1 to 4 mol-% of said copolymer of a monomer having a hydrophilic amine group.

4,999,387

FILLED COHESIVE POLYMER MATRICES AND PROCESS FOR PRODUCING SAME

Roger N. Rothon, Chester; Thomas A. Ryan, Kelsall, and Phillip J. Tavener, Lancs, all of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 205,752, Jun. 13, 1988, abandoned. This application Dec. 26, 1989, Ser. No. 453,201
Claims priority, application United Kingdom, Jun. 11, 1987, 8713693
Int. Cl.[5] C08K 9/04, 9/10
U.S. Cl. 523—205 10 Claims

1. A cohesive polymer matrix comprising a matrix polymer and a coating particulate filler dispersed therein, characterized in that the matrix polymer is an acrylic polymer, and the filler is coated at least in part with a composition comprising an organic coating polymer of number average molecular weight in the range 500–15,000, which contains an unsaturated group present as part of a structure which is the product of polymerizing one or more dienes and an acidic group for precursor thereof and in that the unsaturated group is either bonded or non-bonded to the matrix acrylic polymer.

4,999,388

BRANCHED POLYESTER RESIN COMPOSITION HAVING ENHANCED MELT VISCOSITY

Kevin T. Okamoto, Evansville, Ind., assignor to General Electric Company, Pittsfield, Mass.

Filed Sep. 14, 1989, Ser. No. 406,905
Int. Cl.[5] C08L 63/06
U.S. Cl. 523—400 50 Claims

1. In a thermoplastic resin composition comprising:

(a) a polyester resin;

(b) a polyepoxy compound;

(c) a hindered phenol thermal stabilizer; the improvement comprising (d) an effective amount of at least one additional catalyst compound; whereby either (1) the viscosity of the composition is increased over a composition with equivalent amounts of components (a), (b) and (c); or (2) a composition having the same viscosity as a composition of (a), (b) and (c) is obtained but with a reduction in the amount of (b) employed.

4,999,389

FILLED RESIN COMPOSITIONS AND ARTICLES MADE THEREFROM

Gholamhossein Ariannejad, San Antonio, Tex., assignor to Fiber Glass Systems, Inc., San Antonio, Tex.

Filed Dec. 27, 1988, Ser. No. 290,042
Int. Cl.[5] C08K 7/14, 7/12, 7/04
U.S. Cl. 523—440 13 Claims

1. A curable, thread-forming composition comprising about eighty to twenty percent by weight of thermosetting resin and hardener therefor, and about twenty to eighty percent by weight of filler; said filler consisting essentially of ceramic powder and graphite in fibrous form; said graphite being present in the amount of about one-half to ten percent by weight of said filler.

4,999,390

COMPOSITE BOARD AND A METHOD AND A COMPOSITION FOR ITS PRODUCTION

Aksel T. Bentsen, Viby J, Denmark, assignor to Novopan Traeindustri A/S, Ryomgard, Denmark

PCT No. PCT/DK88/00026, § 371 Date Dec. 14, 1988, § 102(e) Date Dec. 14, 1988, PCT Pub. No. WO88/06081, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 16, 1988, Ser. No. 259,114

Claims priority, application Denmark, Feb. 16, 1987, 772/87

Int. Cl.[5] C08J *3/21;* **C08L** *1/26, 75/04*

U.S. Cl. 524—30 **17 Claims**

1. A composite board comprising at least one layer made from organic fibers, particles and/or chips and a binder composition, the binder composition being polyisocyanate in the form of a sprayable substantially stable 20–70% aqueous emulsion containing a stabilizer which is a cellulose ether or cellulose ether derivative, the polyisocyate being present in an amount of at the most 1.8%, based on the dry weight of the organic fibers, particles and/or chips.

4,999,391

HALOGEN SUBSTITUTED PHTHALIMIDE FLAME RETARDANTS

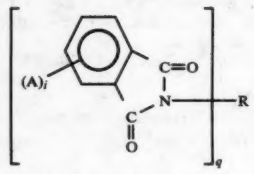
Joseph M. Bohen, King of Prussia, Pa.; Gerald H. Reifenberg, East Windsor, N.J., and Daryl L. Stein, Williamsville, N.Y., assignors to Atochem North America, Inc., Philadelphia, Pa.

Division of Ser. No. 173,487, Mar. 25, 1988, Pat. No. 4,904,795. This application Dec. 15, 1989, Ser. No. 452,131

Int. Cl.[5] C08K *5/3417;* **C08F** *8/00, 283/00;* **C08G** *65/48*

U.S. Cl. 524—94 **10 Claims**

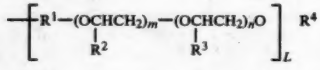
1. A flame retardant composition comprising a thermoplastic or thermosetting resin and an amount of a halogen-substituted phthalimide effective to increase the flame retardancy of said resin, said phthalimide having the formula:



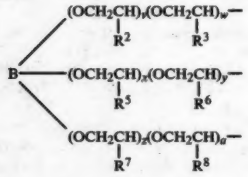
(I)

wherein

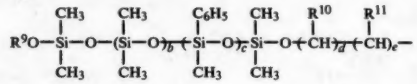
(a) R is selected from



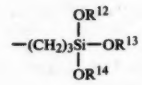
wherein R^1 is alkyl of 1–8 carbons, R^2 and R^3 are H or CH_3 with the proviso that R^2 and R^3 are not the same, and R^4 is alkyl of 1–12 carbons in which some of the carbons may be replaced by oxygen;



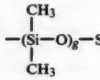
where B is a trivalent alkyl group of 1 14 6 carbons, wherein B does not comprise a central carbon atom bonded to four other carbons, R^5, R^6, R^7 and R^8 are H or CH_3 with the proviso that in the pairs R^2 and R^3, R^5 and R^6, and R^7 and R^8, both members are not the same;



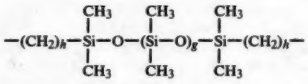
where R^9 is alkyl of 1 to 10 carbons, aryl, or $-(CH_2)_f-$, R^{10} and R^{11} may independently by H or CH_3 with the proviso that R^{10} and R^{11} are not the same, b and c are independently 0 to 100, and d, e and f are independently 0 to 6;



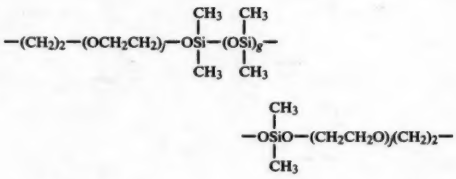
where R^{12}, R^{13} and R^{14} are



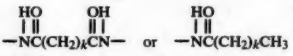
and g=1 to 1000 with the proviso that for each of R^{12}, R^{13} and R^{14}, g may or may not have the same value;



where h=1 to 6;



where j=1 to 500 and



where k=0 to 30;

(b) A is Cl or Br;

(c) i is 1 to 4;

(d) q is an integer of 1 to 6;

(e) L=1 to 2;

(f) m and n independently vary from 0 to 50 with the proviso that both cannot be zero; and

(g) v, w, x, y, z and a independently vary from 0 to 25 with the proviso that for each of the pairs, v and w, x and y, and z and a, both members cannot be zero.

4,999,392

NOVEL PIPERIDINE COMPOUNDS

Giuseppe Cantatore, Bitonto, and Valerio Borzatta, Bologna, both of Italy, assignors to Ciba-Geigy Corproation, Ardsley, N.Y.

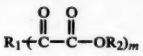
Division of Ser. No. 854,742, Apr. 22, 1986, Pat. No. 4,780,493. This application Jul. 21, 1988, Ser. No. 224,028

Claims priority, application Italy, Apr. 22, 1985, 20441 A/85

Int. Cl.[5] C08K *5/3935;* C07D *211/00*

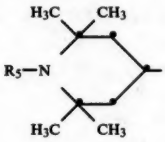
U.S. Cl. 524—99 6 Claims

1. A compound of the formula



wherein m is an integer from 1 to 4 and, if m=1, R_1 is a group

in which R_3 and R_4 are identical or different and are hydrogen, C_1–C_{18}-alkyl, C_2–C_6-alkyl substituted by C_1–C_{18}-alkoxy or by C_2–C_{18}-dialkylamino, C_5–C_{18}-cycloalkyl, C_3–C_{18}-alkenyl, C_6–C_{18}-aryl unsubstituted or substituted by C_1–C_{12}-alkoxy, by C_1–C_{12}-alkyl and/or by —OH, C_7–C_{18}-aralkyl unsubstituted or substituted by C_1–C_{12}-alkyl and/or by —OH or are a group of the formula (II)

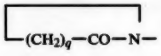


(II)

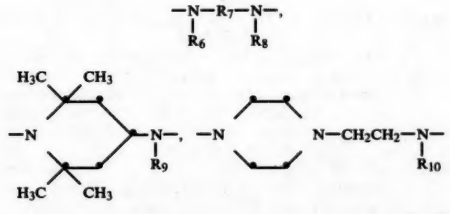
wherein R_5 is hydrogen, 0°, cyanomethyl, C_1–C_{12}-alkyl, C_3–C_{12}-alkenyl or C_3–C_{12}-alkynyl, C_7–C_{12}-aralkyl unsubstituted or substituted by C_1–C_{12}-alkyl, or is C_1–C_{12}-acyl, or R_1 is a 5-membered to 13-membered heterocyclic radical containing at least one nitrogen atom being linked to the

—COCOOR$_2$ radical,

said heterocyclic radical being selected from the group consisting of pyrrolidinyl, piperidino, morpholino, 2,6-dimethylmorpholino, 4-methylpiperazin-1-yl, 3,3,5,5-tetramethylpiperazin-1-yl, hexahydroazepin-1-yl and a radical of the formula



with q=3–11; or if m=2, R_1 is a group

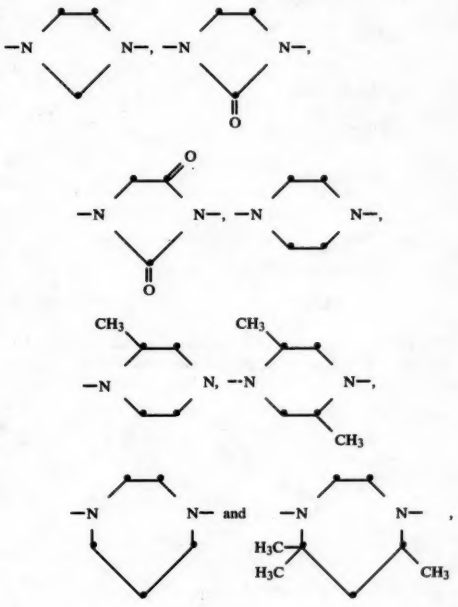


in which R_6, R_8, R_9 and R_{10} are identical or different and are hydrogen, C_1–C_{18}-alkyl, C_5–C_{18}-cycloalkyl unsubstituted or substituted by C_1–C_{12}-alkyl, C_3–C_{18}-alkenyl, C_6–C_{18}-aryl unsubstituted or substituted by C_1–C_{12}-alkoxy, by C_1–C_{12}-alkyl and/or by—OH, C_7–C_{18}-aralkyl unsubstituted or substituted by C_1–C_{12}-alkyl and/or by —OH or are a group of the formula (II) and R_7 is C_2–C_{18}-alkylene, C_6–C_{18}-cycloalkylene, C_6–C_{18}-arylene, C_7–C_{18}-aralkylene or a group —R_{11}—X—(R-12—X)$_n$—R_{11}—, where R_{11} and R_{12} are identical or different and are C_2–C_6-alkylene and X is —O—or

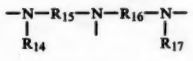
R_{13} is hydrogen, C_1–C_{12}-alkyl, C_5–C_{12}-cycloalkyl unsubstituted or substituted by C_1–C_{12}-alkyl, or is a group of the formula (II) and n is zero, 1 or 2, or R_1 is a 5-membered to 7-membered divalent heterocyclic group containing 2 nitrogen atoms being linked to the

—COCOOR$_2$ radicals,

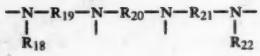
said divalent heterocyclic group being selected from the group consisting of



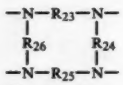
or if m=3, R_1 is a group



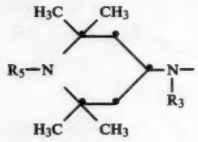
in which R_{14} and R_{17} are identical or different and are hydrogen, C_1–C_{18}-alkyl, C_5–C_{12}-cycloalkyl unsubstituted or substituted by C_1–C_{12}-alkyl, C_7–C_{18}-aralkyl unsubstituted or substituted by C_1–C_{12}-alkyl and/or by —OH or are a group of the formula (II) and R_{15} and R_{16} are identical or different and are C_2–C_6-alkylene, or R_1 is a hexahydro-1,3,5-triazine-1,3,5-triyl group, or if m=4, R_1 is a group



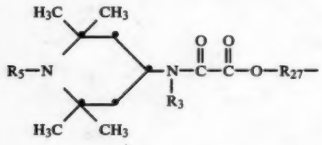
in which R_{18} and R_{22} are identical or different and are as defined for R_{14} and R_{17}, while R_{19}, R_{20} and R_{21} are identical or different and are C_2–C_6-alkylene, or R_1 is a group



in which R_{23}, R_{24}, R_{25} and R_{26} are identical or different and are C_2–C_6--alkylene; R_2 is C_1–C_{18}-alkyl, C_5–C_{18}-cycloalkyl unsubstituted or substituted by C_1–C_{12}-alkyl, C_3–C_{18}-alkenyl, C_6–C_{18}-aryl unsubstituted or substituted by C_1–C_{12}-alkoxy, by C_1–C_{12}-alkyl and/or by —OH, C_7–C_{18}-aralkyl unsubstituted or substituted by C_1–C_{12}-alkyl and/or by —OH, or is a group of the formula (II) or, if m is 1 and R_1 is a group

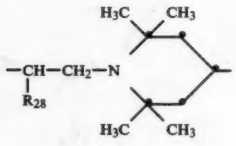


R_2 additionally is a group of the formula (III)

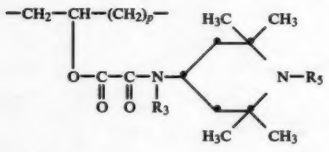


(III)

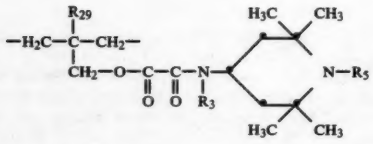
wherein R_3 and R_5 are as defined above and R_{27} is C_2–C_{12}-alkylene, C_6–C_{18}-cycloalkylene or one of the following groups



(R'27)

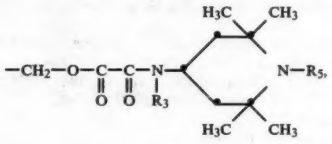


(R''27)



(R'''27)

in which R_{28} is hydrogen or C_1–C_4-alkyl, R_{29} is hydrogen, C_1–C_4-alkyl or a group



R_3 and R_5 are as defined in this claim and p is an integer from 1 to 4, at least one group of the formula (II) being present in R_1 or R_2.

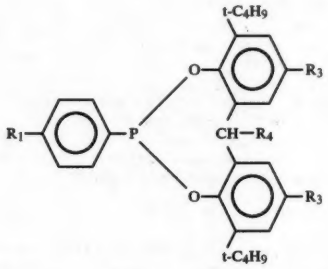
4,999,393

PHOSPHONITE COMPOUND AND SYNTHETIC RESIN COMPOSITION

Tohru Haruna, Saitama, and Kazunori Nishikawa, Chiba, both of Japan, assignors to Adeka Argus Chemical Co., Ltd., Tokyo, Japan

Filed Feb. 6, 1989, Ser. No. 306,921
Claims priority, application Japan, Feb. 10, 1988, 63-29162
Int. Cl.[5] C08K *5/53*; C07F *9/02*
U.S. Cl. 524—126 **10 Claims**

1. A synthetic resin composition comprises 100 parts by weight of a synthetic resin, 0.01 to 10 parts by weight of a cyclic phosphonite compound having the following formula (I):



(I)

in which R_1 is an alkyl, phenyl or an alkylphenyl, R_3 is an alkyl, R_4 is hydrogen or methyl, and 0.001 to 5 parts by weight of an anti-oxidant of an ester of a 3,5-dialkyl-4-hydroxyphenyl-propionic acid or a tris(alkylated-hydroxybenzyl)isocyanurate.

4,999,394

MATERIAL FOR RETAINERS OF TAPERED ROLLER BEARINGS

Teruo Yoshida, and Hiroshi Ueno, both of Osaka, Japan, assignors to Koyo Seiko Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 155,395, Feb. 12, 1988, abandoned. This application Aug. 16, 1989, Ser. No. 394,694
Claims priority, application Japan, Feb. 13, 1987, 62-32135
Int. Cl.[5] C08K *7/14*
U.S. Cl. 524—514 **3 Claims**

1. A retainer for a tapered roller bearing comprising a mixture of 15 to 30% by weight reinforcing glass fiber, 10 to 20% by weight of a polybutadiene elastomer and the remainder a nylon 66 resin.

4,999,395

HIGH PERFORMANCE ARAMID MATRIX COMPOSITES

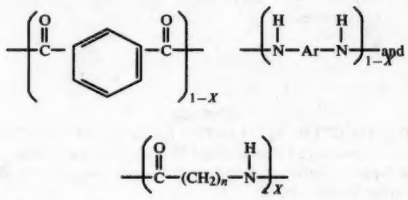
Robert B. Croman, Drexel Hill, Pa.; Hamid M. Ghorashi, Midlothian, Va., and Gurdial Singh, Hockessin, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 12, 1990, Ser. No. 508,877

Int. Cl.[5] C08K 7/06, 7/14; C08L 77/04, 77/14

U.S. Cl. 524—607 3 Claims

1. A high performance composite comprising a matrix formed of a copolyamide consisting of the following units:



where n is 4 or 5: X is from 0.01 to 0.50, preferably from 0.03 to 0.30, and Ar is a radical selected from 3,4'-oxydiphenylene, 1,3-phenylene, 1-methyl-2,4-phenylene, and mixtures of such radicals with each other or with up to equimolar amounts of 1,4-phenylene radicals reinforced with from 10 to 90% by volume of fiber selected from the group consisting of aramid, carbon and glass.

4,999,396

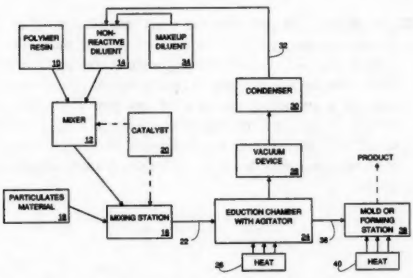
METHOD FOR MAKING LOW RESIN CONTENT POLYMER CONCRETE

Larry J. Farrell, 675 Grove Ter., Elk Grove, Ill. 60007

Filed Nov. 25, 1988, Ser. No. 276,266

Int. Cl.[5] C08K 3/00; C04B 26/04, 40/00

U.S. Cl. 524—650 12 Claims



12. A method for making a low resin content polymer concrete article having less than 10% by weight resin, said method including the steps of:

supplying a quantity of polymer or monomer resin;

adding a non-reactive solvent, vehicle, dispersant or diluent to the resin;

supplying the mixture of diluent and resin to a mixing station;

supplying filler material to the mixing station;

mixing the diluent, resin and filler material at the mixing station;

supplying the resultant mixture to an eduction chamber;

educing the non-reactive diluent from the mixture in the education chamber; and

supplying the resulting mixture with diluent educed to a forming station for shaping and curing.

4,999,397

METASTABLE SILANE HYDROLYZATES AND PROCESS FOR THEIR PREPARATION

Keith D. Weiss, and Cecil L. Frye, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed Jul. 28, 1989, Ser. No. 386,450

Int. Cl.[5] C08K 5/06

U.S. Cl. 524—755 5 Claims

1. A method for the preparation of a silane hydrolyzate of the formula

$$(RSi(OH)_xO_{\frac{3-x}{2}})_n$$

where R is hydrogen or a methyl group, n is an integer greater than about 8, and x is a number between 0 and 2, comprising the steps of:

(a) adding to a non-sulfur containing polar organic solvent a trichlorosilane, an effective amount of water or hydrochloric acid, and at least a substantially stoichiometric amount of a metal oxide to form a reaction mixture, and

(b) reacting said reaction mixture to form a soluble silane hydrolyzate and a metal chloride; and

(c) removing said metal chloride from said silane hydrolyzate.

4,999,398

METHODS FOR MAKING POLYDIORGANOSILOXANE MICROEMULSIONS

Daniel Graiver, Midland, Mich., and Osamu Tanaka, Chiba, Japan, assignors to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 128,250, Dec. 3, 1987, abandoned, which is a division of Ser. No. 809,090, Dec. 12, 1985, abandoned. This application Jul. 24, 1989, Ser. No. 383,497

Int. Cl.[5] C08L 83/00

U.S. Cl. 524—837 1 Claim

1. A clear, stable, aqueous microemulsion of polydiorganosiloxane produced by the method which comprises: sequentially adding a precursor emulsion comprised of cyclopolydiorganosiloxane, surfactant, and water to a polymerization medium comprised of water and an effective amount of a polymerization catalyst while mixing wherein the rate of addition of the precursor emulsion is effective to form a clear, stable microemulsion which has polydiorganosiloxane droplets of less than 0.15 micron average size, and which contains a surfactant to polydiorganosiloxane weight ratio of 0.15 to 5.

4,999,399

POLYMER COMPOSITIONS

Edgar J. Smutny, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jan. 29, 1990, Ser. No. 471,466

Int. Cl.[5] C08L 23/00, 33/02, 101/06

U.S. Cl. 525—185 11 Claims

1. A stabilized polymer composition comprising a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon and a stabilizing quantity of the reaction product of an oxy-bridged zinc-aluminum compound and an acidic polymer containing moieties of an α-olefin and an α,β-ethylenically unsaturated carboxylic acid.

4,999,400

METAL CARBOXYLATE DERIVATIVES FOR USE IN SYNTHETIC MATERIALS, EMULSIONS AND SUSPENSIONS

Helmut Kuhne, Kreuzau; Karl-Heinz Frassek, Langerwehe; Dieter Sonderhof, Düren; Günther Lanzrath, Merzenich; Fritz Steinseifer, Langerwehe, and Heinz Beck, Düren, all of Fed. Rep. of Germany, assignors to Akzo N.V., Netherlands

Continuation of Ser. No. 223,346, Jul. 25, 1988, abandoned, which is a division of Ser. No. 117,451, Nov. 4, 1987, Pat. No. 4,775,723, which is a continuation of Ser. No. 795,176, Nov. 5, 1985, abandoned. This application Dec. 1, 1989, Ser. No. 443,829

Claims priority, application Netherlands, Nov. 5, 1984, 8403347

Int. Cl.[5] C08F *8/00*

U.S. Cl. 525—196 **10 Claims**

1. A method of processing chlorine-containing synthetic materials, comprising adding to said materials a lubricant which is a metal carboxylate of a partially esterified α-olefin-ethylene dicarboxylic acid copolymer, the α-olefin containing 6 to 40 carbon atoms and the polycarboxylic acid units in the copolymer being esterified with 0.5 to 1.5 equivalents of an alcohol containing 1 to 40 carbon atoms, at least one metal of said carboxylate being selected from the group consisting of barium, cadmium, calcium, magnesium, lead, tin and zinc, the ratio of the α-olefin to the polycarboxylic units in the copolymer being in the range of from 1:2 to 2:1, said unesterified copolymer having an average molecular weight in the range of from 2,000 to 30,000, and at least 80 percent by weight of the unesterified copolymer having a molecular weight in the range of from 1,000 to 100,000.

4,999,401

LINEAR ADDITION POLYMER WITH HYPERPOLARIZABLE SIDE GROUPS

Carel T. J. Wreesmann, Arnhem, and Erwin W. P. Erdhuisen, Duiven, both of Netherlands, assignors to Akzo N.V., Netherlands

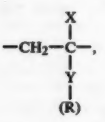
Filed Mar. 22, 1988, Ser. No. 171,550

Claims priority, application Netherlands, Apr. 3, 1987, 8700787

Int. Cl.[5] C08F *8/00*

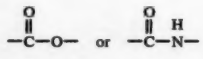
U.S. Cl. 525—279 **8 Claims**

1. A linear addition polymer having side groups which possess a molecular hyperpolarizability of at least 10^{-38} m^4/V, wherein the recurring units of the polymer correspond to the formula



wherein X represents a hydrogen atom or a lower alkyl group and

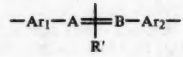
Y represents a



group wherein Y is attached by a carbon atom to the polymer chain and R is at least one member selected from the group consisting of

(a) a hyperpolarizable group having a molecular hyperpolarizability β of at least 10^{-38} m^4/V, optionally with a spacer,

(b) a hydrogen atom or a substituted or unsubstituted organic group having not more than 30 carbon atoms, provided that nearly all recurring units contain a hyperpolarizable group, the hyperpolarizable group having a molecular hyperpolarizability β of at least 10^{-38} m^4/V comprising a conjugated π-electron system of the formula



wherein Ar_1 and Ar_2 may be the same or different and represent a divalent aromatic group, A and B are the same or different and represent CH or N, and wherein R′ is selected from the group consisting of hydrogen, halogen, lower alkyl, lower alkoxy, nitro, cyano and trifluoromethyl.

4,999,402

METHACRYLIC ACID ESTER RESIN COMPOSITION

Sumio Yamamoto, Takasago, and Shinichi Sakurai, Suita, both of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Sep. 6, 1988, Ser. No. 240,659

Claims priority, application Japan, Sep. 7, 1987, 62-224704

Int. Cl.[5] C08F *265/04*

U.S. Cl. 525—305 **11 Claims**

1. A resin composition comprising the product of a two stage emulsion polymerization, which product comprises:

(A) 10 to 50 parts by weight, per 100 parts of said resin composition, of a crosslinked acrylic acid ester elastomer which was prepared by emulsion polymerizing a first monomer mixture (1) comprising not less than 60% by weight of an alkyl acrylate (i), having 1 to 8 carbon atoms in its alkyl group; not more than 40% by weight of an alkyl methacrylate (ii), having 1 to 4 carbon atoms in its alkyl group; and 0.1 to 20% by weight, based on the combined weight of said first monomer mixture (1), of a polyfunctional monomer having not less than 2 non-conjugated double bonds per one molecule, copolymerizable with said alkyl acrylate (i) and said alkyl methacrylate (ii); and

(B) emulsion graft polymerized onto said elastomer, in the effective presence of 0.01 to 10% by weight, based on the weight of grafting monomers, of a chain transfer agent; 50 to 90 parts by weight, per 100 parts of said resin composition, of a monomer mixture of not less than 60% by weight of an alkyl methacrylate, having 1 to 4 carbon atoms in its alkyl group, and not more than 40% by weight of an alkyl acrylate having 1 to 8 carbon atoms in its alkyl group.

4,999,403

GRAFT POLYMERS OF FUNCTIONALIZED ETHYLENE-ALPHA-OLEFIN COPOLYMER WITH POLYPROPYLENE, METHODS OF PREPARATION, AND USE IN POLYPROPYLENE COMPOSITIONS

Sudhin Datta, Matawan, and David J. Lohse, Bridgewater, both of N.J., assignors to Exxon Chemical Patents Inc., Linden, N.J.

Filed Oct. 28, 1988, Ser. No. 264,484

Int. Cl.[5] C08F *255/02*

U.S. Cl. 525—322 **10 Claims**

1. A graft copolymer composition comprising a functionalized substantially amorphous ethylene-alpha-olefin copolymer having isotactic polypropylene grafted thereto through one or more functional linkages formed from the reaction of functional groups on the ethylene-alpha-olefin copolymer with maleic moieties on the polypropylene.

4,999,404

MONOMER RESIN

Taketo Matsuki, Nishinomiya, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan

PCT No. PCT/JP85/00545, § 371 Date Jun. 3, 1987, § 102(e) Date Jun. 3, 1987, PCT Pub. No. WO87/02039, PCT Pub. Date Apr. 9, 1987

PCT Filed Oct. 3, 1985, Ser. No. 67,790

Int. Cl.[5] C08F *8/44*

U.S. Cl. 525—329.6 5 Claims

1. An ionomer resin comprising an ionomer resin product prepared by additionally neutralizing with magnesium hydroxide free carboxyl groups of a sodium neutralized ionomer resin,

said sodium neutralized ionomer resin being prepared by copolymerizing 96 to 70% by weight of a monoolefin with 4 to 30% by weight of an unsaturated mono- or di-carboxylic acid having 3 to 8 carbon atoms or an ester thereof and neutralizing with sodium, said weight % being based on the total weight of the monomer,

wherein said magnesium hydroxide is added to said sodium neutralized ionomer resin in an amount sufficient to neutralize 20 to 30% of the free carboxyl groups in said sodium neutralized ionomer resin and mixing at a temperature of from 150° to 250° C.

4,999,405

COMPOSITIONS OF AND A METHOD FOR PREPARING HIGH-TEMPERATURE OIL RESISTANT ELASTOMERS FROM HYDROGENATED BUTADIENE ALKENYLPYRIDINE COPOLYMERS

Tonson Abraham, Elyria, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

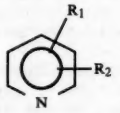
Filed Dec. 14, 1989, Ser. No. 450,945

Int. Cl.[5] C08F *8/04*

U.S. Cl. 525—338 34 Claims

1. A method of preparing an oil resistant elastomer, which comprises;

forming, by emulsion polymerization, a random copolymer having a cis-trans 1,4 microstructure from two monomeric classes wherein the first monomeric class is a conjugated diene or branched conjugated diene or mixtures thereof containing from 4 to 8 carbon atoms and the second monomeric class is polar and is of the general formula



(I)

wherein R_1 is an alkenyl group containing from about 2 to about 8 carbon atoms, and R_2 is hydrogen or, an alkyl group containing from 1 to about 8 carbon atoms, with the proviso that said second monomeric class can be replaced with up to about 20 percent by weight of the general formula $CH_2{=}CR_3CX$ wherein R_3 is hydrogen or CH_3 and X is $-OOR_4$, $-ONR_5R_6$ or $-OOR_7OR_4$ wherein R_4 is an alkyl group containing from 1 to about 4 carbon atoms, $-CH_2CF_3$ or $-CH_2CF_2CF_2H$, R_5 and R_6 are independently alkyl groups containing from 1 to about 4 carbon atoms, and R_7 is an alkylene group containing from 1 to about 4 carbon atoms, wherein an emulsion polymerization catalyst is employed; and

complexing a transition metal catalyst with a first complexing agent to form a transition metal catalyst complex; and hydrogenating said random copolymer in the presence of said transition metal catalyst complex and a trialkyl aluminum wherein the alkyl group contains from 1 to about 4 carbon atoms and further in the absence of boron trifluoride or boron trifluoride etherate; and

deactivating said transition metal catalyst after hydrogenation by the use of a second complexing agent in the absence of air.

4,999,406

REACTIVE POLYVINYL CHLORIDE AND POLYMER PRODUCTS MADE THEREFROM

Zaev Sharaby, South Euclid, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Division of Ser. No. 276,175, Nov. 25, 1988, Pat. No. 4,871,801. This application Sep. 1, 1989, Ser. No. 402,004

Int. Cl.[5] C08C *19/00;* C08F *8/00*

U.S. Cl. 525—386 10 Claims

1. A process for the production of a copolymer comprising combining reacting a vinyl halide base polymer containing pendant hydroxy groups and a cyclic polyanhydride functionalizing agent under anhydrous melt blending conditions, whereby the functionalizing agent covalently bonds to the base polymer through a reaction occurring between the hydroxyl groups on the base polymer and a cyclic anhydride group(s) on the functionalizing agent, wherein said functionalizing agent after bonding onto the base polymer has free cyclic anhydride group(s) available for further reaction to produce a first reactive moiety for further reaction; said first reactive moiety is then reacted with a second coreactive moiety under anhydrous melt blending conditions, said second moiety containing at least one group which is capable of reacting with said first moiety thereby forming a covalent linkage between the first and second moiety.

4,999,407

HOT-MELT POLYURETHANE ADHESIVE COMPOSITIONS

Heinz G. Gilch, Bad Homburg, and Karl-Heinz Albert, Oberursel, both of Fed. Rep. of Germany, assignors to Bostik, Inc., Middletown, Mass.

Filed May 4, 1989, Ser. No. 347,124

Claims priority, application United Kingdom, May 6, 1988, 8810701

Int. Cl.[5] C08G *18/10, 18/70*

U.S. Cl. 525—457 11 Claims

1. A quick setting, hot-melt polyurethane adhesive composition comprising:

a mixture of at least two amorphous polyurethane prepolymers, wherein at least one polyurethane prepolymer has a glass transition point above room temperature and at least one polyurethane prepolymer has a glass transition point below room temperature.

4,999,408

METHOD OF CROSSLINKING RESIN WITH CARBOXYL POLYCARBONATE

Niles R. Rosenquist, Evansville, Ind., assignor to General Electric Company, Mt Vernon, Ind.

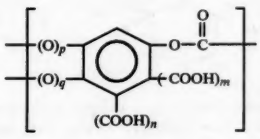
Division of Ser. No. 280,847, Dec. 7, 1988, Pat. No. 4,927,914. This application Jan. 8, 1990, Ser. No. 461,726

Int. Cl.[5] C08F *283/02, 6/00, 283/04;* C08L *69/00*

U.S. Cl. 525—463 11 Claims

1. A method of cross-linking a resin selected from the group consisting of a polycarbonate resin, a polyamide resin, a polyester resin, a polyurethane resin and a polyether resin, which comprises;

adding to the resin a polycarbonate resin, containing in the polymer chain at least one divalent moiety of the formula;



wherein m, n, p and q are each whole number integers of

from 0 to 1 and the sum of m plus n is one and the sum of p plus q is one.

4,999,409

DIOLEFIN POLYMER OF COPOLYMER AND A PROCESS FOR THE PRODUCTION OF THE SAME

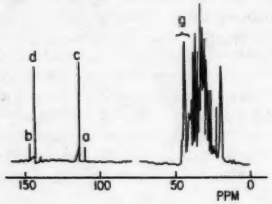
Yoshiharu Doi, Kanagawa; Kazuo Soga, Tokyo, and Satoshi Ueki, Saitama, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 29, 1988, Ser. No. 251,091

Claims priority, application Japan, Sep. 29, 1987, 62-242804

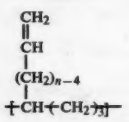
Int. Cl.[5] C08F *4/68*

U.S. Cl. 526—169.2 **12 Claims**



1. A diolefin copolymer consisting essentially of, in combination, the following recurring units (A) and (B):

(A)


(B)

wherein n=4 to 6 and A/B mole ratio=0 to 98/100 to 2.

4,999,410

ACRYLATE ESTER ETHER DERIVATIVES

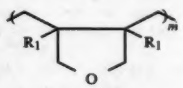
Lon J. Mathias, Hattiesburg, Miss., and Selim H. Kusefoglu, Ann Arbor, Mich., assignors to University of Southern Mississippi, Hattiesburg, Miss.

Division of Ser. No. 86,589, Aug. 18, 1987, Pat. No. 4,889,948. This application Dec. 22, 1989, Ser. No. 455,955

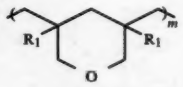
Int. Cl.[5] C08F *20/04*

U.S. Cl. 526—318.3 **3 Claims**

1. A cyclopolymer having a repeating unit selected from the group consisting of:



and



wherein R_1 is a member selected from the group consisting of carboxy, carboxyalkyl, carbonylalkyl, cyano, carboxamide, substituted carboxamide, phenyl and substituted phenyl and m is the number of repeating units and is greater than 5.

4,999,411

PREPARATION OF ORGANIC POLYMERS USING ORGANOMETALLIC CAPPED MONOMERS TO PRODUCE METAL FREE POLYMERS

Ian D. H. Towle, Gloucestershire, England, and Patrick J. Horner, Menlo Park, Calif., assignors to Raychem Limited, Swindon, England

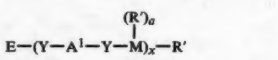
Division of Ser. No. 355,936, May 23, 1989, Pat. No. 4,960,835, which is a division of Ser. No. 257,159, Oct. 12, 1988, Pat. No. 4,845,179, which is a continuation of Ser. No. 163,225, Feb. 26, 1988, abandoned, which is a continuation of Ser. No. 900,473, Aug. 22, 1986, abandoned, which is a continuation-in-part of Ser. No. 833,656, Feb. 21, 1986, abandoned, which is a continuation of Ser. No. 704,452, Feb. 22, 1985, abandoned. This application Jul. 25, 1990, Ser. No. 557,883

Claims priority, application United Kingdom, Feb. 27, 1984, 8405049

Int. Cl.[5] C08G *63/22, 63/34, 63/62, 63/64*

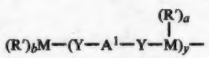
U.S. Cl. 528—9 **18 Claims**

1. A method of preparing a thioester, thiocarbonate, thioamide, or thioimide polymer or copolymer, comprising reacting a monomeric, oligomeric, or polymeric nucleophilic reactant of the formula

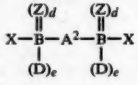


where E is

or



each M is independently tin, germanium, lead, or thallium;
each R' is independently a substituted or unsubstituted alkyl or aryl group;
each Y is independently oxygen, sulfur, or substituted nitrogen or phosphorus;
each A^1 is independently an aromatic, aliphatic, aromatic-/aliphatic, heterocyclic, alicyclic, siloxyl, or silane monomeric, oligomeric or polymeric moiety;
each a is an integer two less than the valence of the element M to which it pertains;
each b is an integer one less than the valence of the element M to which it pertains; and
x and y are each independently an integer greater than or equal to 1;
with a substantially stoichiometric amount of an electrophilic reactant selected from the group consisting of
(i) a compound of the formula



where each X is independently halide, imidazole, RO-, RS-, or a group capable of reacting with the first reactant to eliminate a by-product containing M and X, R being a substituted or unsubstituted aromatic or aliphatic group or hydrogen;
each B is independently carbon, phosphorous, sulfur, silicon, or a direct bond;
each Z is independently oxygen, sulfur, or an imino group;
each D is independently an aromatic, aliphatic, RO-, RS-, or R_2N- group is B is silicon;
each d is independently 1 if B is carbon; 0 or 1 if B is phosphorus; 0, 1, or 2 if B is sulfur; and 0 is B is silicon or a direct bond;

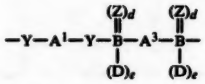
each e is independently 0 if B is carbon, sulfur, or a direct bond; 1 if B is phosphorus; and 2 if B is silicon; and

A^2 is an aromatic, aliphatic, aromatic/aliphatic heterocyclic, alicyclic, siloxyl, or silane monomeric, oligomeric, or polymeric moiety, which is the same or different from A^1, or a direct bond;

(ii) a compound of the formula

(iii) combination of (i) and (ii);

with the proviso that at least one Y and/or Z is sulfur; to produce a polymer having the repeat unit



where A^3 is A^2 or Y-A^1-Y.

4,999,412

SILICONE-URETHANE COPOLYMERS

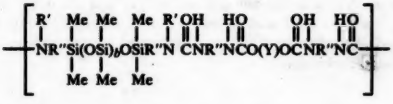
Robert S. Neale, Wilmington, N.C., and Curtis L. Schilling, Jr., Croton-on-Hudson, N.Y., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Jun. 28, 1989, Ser. No. 372,465

Int. Cl.[5] C08G 77/04

U.S. Cl. 528—28 **12 Claims**

1. A linear silicone-urethane copolymer capable of providing films of high strength and elasticity, having repeating unit structures represented by the following formula:



wherein R′ is selected from the group consisting of hydrogen and alkyl groups having 1 to 3 carbon atoms; R″ is a divalent hydrocarbon group having at least 3 carbon atoms;

b is about 10–100;

Y represents a divalent hydrocarbon group containing a tertiary amine ($C_zH_{2z+1}N$) wherein z is 5 to 22 or a quaternary ammonium group ($C_zH_{2z+1}N^+X^-R'$) wherein X is selected from the group consisting of a halide atom, an acetate or high carboxylate group, and an alkysulfate group where the alkyl moiety has 1 to 12 carbon atoms; and wherein R′, R″ and b may vary within each copolymer.

4,999,413

ORGANOSILOXANE AMINE COPOLYCONDENSATES, METHOD OF THEIR PREPARATION AND USE (II)

Peter Panster, Rodenbach; Horst Grethe, and Peter Kleinschmit, both of Hanau, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 3, 1989, Ser. No. 431,220

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1988, 3837416

Int. Cl.[5] C08G 77/22

U.S. Cl. 528—30 **22 Claims**

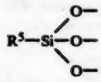
1. An organosiloxane amine copolycondensate, obtained from at least one unit of the formula:

(I)

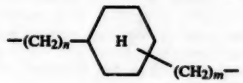
and at least one unit of the formula:

(II)

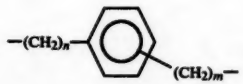
in which R^1 to R^4 are identical or different and signify a group of the formula:

 (III)

wherein R^5 is bound directly to the nitrogen or to the single-bonding X and represents a linear or branched alkylene with 1 to 10 C atoms, a cycloalkylene with 5 to 8 C atoms or a unit of the formula:

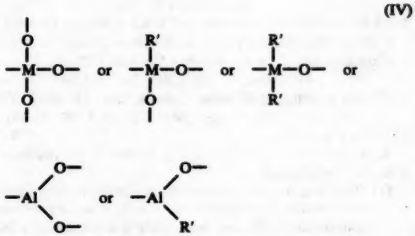


or

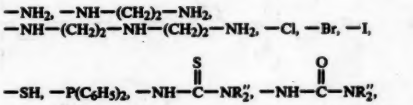


in which n is a number from 1 to 6 and represents the number of methylene groups in the nitrogen position or in the X position and m is a number from 0 to 6,

wherein the free valences of the oxygen atoms bound to the silicon atoms are connected in a silica lattice by silicon atoms of further groups of formula III and/or via the metal atoms in one or more cross-linking bridge members:

 (IV)

M is silicon, titanium or zirconium and R′ is linear or branched alkyl with 1 to 5 C atoms or phenyl and the ratio of the silicon atoms from the formula III to the metal atoms in the bridge members is 1 :0 to 1: 10 and X in formula II stands for:



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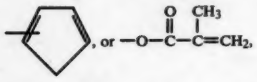


wherein R'' is identical to H or signifies a linear or branched alkyl with 1 to 5 C atoms.

4,999,414

PROCESS FOR THE PRODUCTION OF AROMATIC POLYETHER KETONES

Joachim Genz; Erhard Tresper; Karsten-Josef Idel; Ludwig Bottenbruch, and Volker Eckhardt, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jul. 17, 1989, Ser. No. 381,048

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1988, 3825149; Dec. 2, 1988, 3840617

The portion of the term of this patent subsequent to Sep. 4, 2007, has been disclaimed.

Int. Cl.[5] C08G *8/02, 65/38*

U.S. Cl. 528—125 **4 Claims**

1. A process for the production of crystalline, aromatic polyether ketones from aromatic dihydroxy compounds and aromatic dihalogen compounds containing at least one keto group or aromatic monohydroxy monohalogen compounds containing at least one keto group, optionally in the presence of alkali compounds, characterized in that N-substituted lactams corresponding to formula (I)

(I)

in which

R represents C_2–C_{10} alkyl, C_5–C_{24} cycloalkyl, C_6–C_{18} aryl, C_7–C_{25} alkylaryl, C_7–C_{25} arylalkyl and

n is the number 3, 4 and 5, are used as the solvent.

4,999,415

AROMATIC POLYSULFONE COMPOUNDS AND THEIR MANUFACTURE

Michael D. Guiver, Ottawa, and Oleh Kutowy, North Gower, both of Canada, assignors to National Research Council of Canada/Conseil de Recherches Canada, Ottawa, Canada

Filed Dec. 7, 1988, Ser. No. 281,042

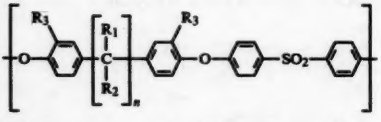
Claims priority, application Canada, Dec. 11, 1987, 554119

Int. Cl.[5] C08G *75/00*; C08F *283/00*; C08L *81/00*

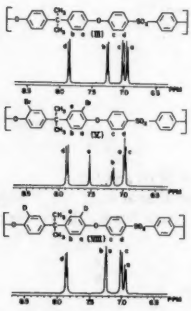
U.S. Cl. 528—171 **9 Claims**

1. A method of manufacturing aromatic polysulfone compounds, comprising,

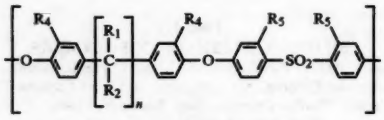
(a) lithiating, by adding at a temperature less than about 0° C. and in an inert, anhydrous atmosphere, an organo-metallic compound of lithium to a solution comprising a polysulfone compound and an anhydrous solvent therefor, the polysulfone compound having repeat units of the general formula:



wherein n is one or zero, and when n is one, R_1 and R_2 each represent alkyl or aryl groups, at least one R_3 per polymer chain being selected from the group consisting of bromine and chlorine with any remaining R_3 being hydrogen, and



(b) continuing the lithiation so as to form a lithiated compound having repeat units of the general formula:



wherein n, R_1 and R_2 are as previously defined, and, depending on the degree of lithiation at least one R_4 per polymer chain is lithium and is produced from the R_3 at that site by metal-halogen exchange to be a lithiated carbanion, any remaining R_4 being the previously defined R_3 at that site, and, if the degree of lithiation is such that a predominant number of R_3 are lithiated by the metal-halogen exchange, and the lithiation is continued, at least one R_5 per polymer chain is lithium produced from lithium-hydrogen exchange at that site to be a lithiated carbanion.

4,999,416

WHOLLY AROMATIC POLYESTERS

Tadahiro Kaminade, Kawasaki; Shigeki Iida, Yokohama; Tomohiro Toya, Yokohama, and Hajime Hara, Fujisawa, all of Japan, assignors to Nippon Oil Company, Limited, Tokyo, Japan

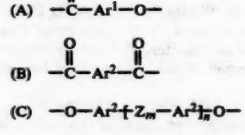
Filed Jan. 19, 1990, Ser. No. 467,383

Claims priority, application Japan, Jan. 25, 1989, 1-14109

Int. Cl.[5] C08G *63/02*

U.S. Cl. 528—190 **4 Claims**

1. A wholly aromatic polyester consisting essentially of structural units (A), (B) and (C), said units having the structural formulae



wherein Ar^1 and Ar^2 each represent a divalent aromatic hydrocarbon group having 6 to 20 carbon atoms, unsubstituted or substituted with a halogen atom, an alkyl or alkoxy group having

1 to 4 carbon atoms or phenyl; Z is

—O—, or —SO_2—;

m is 0 or 1; and n is 0 or 1, with the provisos that 0.2 to 40 mole %, based on the total molar concentration of said units, are in the ortho configuration and at least 60 mole % of Ar^1, based on the total molar concentration of Ar^1, is selected from the group consisting of 1,4-phenylene, substituted 1,4-phenylenes, naphthyl and 4,4'-biphenyl.

4,999,417

BIODEGRADABLE POLYMER COMPOSITIONS

Abraham J. Domb, Baltimore, Md., assignor to Nova Pharmaceutical Corporation, Baltimore, Md.

Filed Mar. 30, 1989, Ser. No. 330,588
Int. Cl.[5] C08G 67/02
U.S. Cl. 528—271 19 Claims

1. A biodegradable polyanhydride or polyester polymer selected from the group consisting of:

(a) polymers of at least one dicarboxylic acid made by coupling an amino acid with another molecule having a carboxylic acid group, said polymer including the repeating unit:

(OC—R—NR'—Z—R"—COO);

(b) polymers of at least one dicarboxylic acid made by coupling two amino acids using a coupling agent, said polymer including the repeating unit:

(OC—R—NR'—Z—R"—Z—NR'—COO);

(c) polymers of at least one dicarboxylic acid made by direct coupling of two amino acids by an azo or urea bond, said polymer including the repeating unit:

(OC—R—NR'—X—NR'—R—COO)

d. Polymers of at least one dicarboxylic acid made by coupling an amino acid with another molecule having a carboxylic acid group, and at least one glycol, the polymer being characterized by the repeating unit:

(OC—R—NR'—Z—R"—COO—R"'—O)

e. Polymers of at least one diacid made by coupling of two amino acids using a coupling agent, and at least one glycol, the polymer being characterized by the repeating unit:

(OC—R—NR'—Z—R"—Z'NR'—COO—R"'—O)

and,

f. Polymers of at least one diacid made by direct coupling of two amino acids, by an azo, urea or thiourea bond, and at least one glycol, the polymer being characterized by the repeating unit:

(OC—R—NR'—X—NR'—R—COO—R"'—O)

wherein

R is an aliphatic, aromatic or heterocyclic amino acid residue;

R' is hydrogen, alkyl or a direct bond;

R" and R"' are the same or different aliphatic, aromatic or heterocyclic residues;

Z is an amido, urethane, imido, azo, urea or thiourea linkage; and

X is an azo, urea or thiourea bond, provided that in the case of polymers (a), Z has a value other than imido.

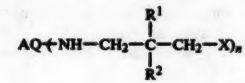
4,999,418

POLYESTERS COLORED WITH THE RESIDUE OF HEAT STABLE ANTHRAQUINONE COMPOUNDS

James J. Krutak; Max A. Weaver; Clarence A. Coates, Jr., all of Kingsport; Samuel D. Hilbert, Jonesborough; Wayne P. Pruett, and William W. Parham, both of Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 31, 1989, Ser. No. 401,270
Int. Cl.[5] C08G 63/20
U.S. Cl. 528—272 20 Claims

1. A colored polyester composition comprising extrusion, molding and fiber grade polyester having reacted therewith or copolymerized therein about 1 to 5,000 ppm of the residue of one or more anthraquinone compounds having the formula



wherein

AQ is the residue of a 9,10-anthraquinone radical;

R^1 and R^2 are the same or different and are unsubstituted or substituted alkyl, cycloalkyl or aryl;

X is a group reactive with at least one of the functional groups of the monomers from which the polyester is prepared; and

n is 1 or 2.

4,999,419

POLYIMIDE RESINS FROM BIS-IMIDE, MONOMER HAVING TWO METHYLENE GROUPS ACTIVATED BY ADJACENT CARBONYLS, AND POLYAMINE

Alfred J. Restaino, Wilmington, Del., assignor to Creative Assets and Consulting Corporation, Wilmington, Del.

Continuation of Ser. No. 881,853, Jul. 3, 1986, Pat. No. 4,822,870. This application Feb. 6, 1989, Ser. No. 306,463
Int. Cl.[5] C08G 73/12
U.S. Cl. 528—322 1 Claim

1. The polyimide addition polymer made by reacting (1) a monomer having two methylene groups activated by adjacent carbonyls with (2) an ethylenically unsaturated bis-imide compound and (3) polyamines selected from a compound having the general formulas $NR^3R^5R^6$ or $R^4R^5N—x—N—R^6R^7$, where R^3 is independently selected from hydrogen, monovalent alkyl, aryl, alkyl aryl or alkoxy groups having 1–30 carbon atoms and R^4, R^5, R^6 and R^7 are independently selected from hydrogen, alkyl, cycloalkyl, aryl, aryl alkyl radicals having up to 20 carbon atoms, provided that at least one of R^3, R^4, R^5, R^6 and R^7 must be H.

4,999,420

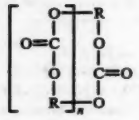
POLYMERIZATION OF CYCLIC AROMATIC OLIGOMERS WITH LOW TEMPERATURE APROTIC ORGANIC SOLVENT

Edgar Leitz, Dormagen; Ludwig Bottenbruch, Krefeld; Karl-Heinz Ott, Leverkusen; Alfred Jung, Krefeld, and Ulrich Grigo, Kempen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Sep. 14, 1989, Ser. No. 407,082
Claims priority, application Fed. Rep. of Germany, Sep. 20, 1988, 3831886
Int. Cl.[5] C08G 64/30
U.S. Cl. 528—371 2 Claims

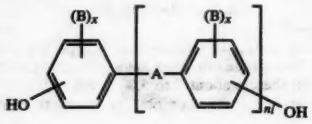
1. A process for the production of a linear aromatic polycarbonate comprising polymerizing at least one cyclic aromatic carbonate oligomeric monomer corresponding to

(I)



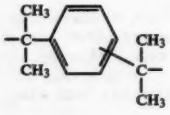
wherein n represents 1 to 30 and R represents the divalent aromatic radical derived from

(II)



wherein A represents a single bond or A is C_{1-5} alkylene, C_2–C_5-alkylidene, C_5 or C_6 cycloalkylidene, —O—, —SO—, —S—, —SO_2—, —CO— or a radical radical corresponding to

(IIa)



B represents chlorine, bromine or methyl, X represents 0,1 or 2 n_1 represents 1 or 0, in the presence of aprotic organic solvents and at least one organo-alkali metal compound initiator, with the exclusion of atmospheric oxygen and atmospheric moisture, the monomer/solvent ratio being from 1 to 50 parts by weight monomer per 100 parts by weight solvent and the polymerization temperature being from −50 to 100° C.

4,999,421

HTLV-I ANTI-SENSE RNA AND ENCODED PROTEINS

Terence K. Brunck, Alameda; David J. Larocca, San Leandro, and John J. Monahan, Orinda, all of Calif., assignors to Triton Biosciences Inc., Alameda, Calif.

Filed Jun. 27, 1988, Ser. No. 211,749
Int. Cl.[5] C07K *13/00*
U.S. Cl. 530—350 **1 Claim**

1. A polypeptide which is expressed by the anti-sense strand of the HTLV-I viral genome and having one of the following sequences:

(I)

Arg-Arg-Met-His-Gly-Pro-Ala-Arg-Ile-Thr-Arg-Arg-Ser-Ser-Ala-Thr-Arg-Val-Ile-Pro-Val-Cys-Lys-Ala-Ser-Arg-Ala-His-Cys-Glu-Arg-Pro-Arg-Ser-Gln-Leu-Arg-Pro-Gln-Pro-Val-Arg-Thr-Arg-Phe-Ser-Arg-Gly-Gly-Leu-Ser-Cys-Ser-Ile-Gly-Thr-Trp-C'lu-Leu-Val-Ile-Phe-Gly-Lys-Arg-His-Cys-Ser-Cys-Asn-Ala-Leu-His-Asn-Pro-Pro-Cys-Ser-Gln-Asn-Arg-Arg-Ser-Arg-Pro-Arg-Leu-Phe-Trp-Ala-Ala-Tyr-Cys-Ala-Ile-Leu-Ser-Arg-Phe-Leu-Trp-Phe-Leu-Thr-Ile-Ala;

(II)

Ser-Pro-Lys-Met-Arg-Gly-Gln-Asn-Trp-Lys-Asn-Lys-Ile-Lys-Val-Ala-Arg-Asn-Leu-Pro-Met-Val-Leu-Glu-Val-Phe-Phe-Phe-Gly-Ile-Gly-Gly-Ala-Ser-Asp-Gly-Ser-Trp-Ala-Cys-Ser-Ser-Leu-Glu-Glu-Ser-Pro-Arg-Asp-Pro-Leu-Gly-Arg-Thr-Ser-Ala-Tyr-Arg-Asp-Glu-Ser-Ser-Ala-Gly-Ser-Phe-Leu-Glu-Ser-Leu-Leu-Trp-Ser-Phe-Pro-Leu-Ala-Ala-Ile-Lys-Thr-Arg-Lys-Leu-Glu-Ile-Ile-Pro-Met-Gly-Leu-Phe-Ile-Ala-Glu-Gly-Thr-Cys-Leu-Trp-Asp-Arg-Leu-Glu-Ser-Gly-Gly-Val-Val-Lys-Leu-Pro-Ser-Gly-Phe-Val-Ala-Val-Gly;

-continued

(III)

Arg-Val-Ser-Gly-Pro-Gln-Val-Val-Asp-Glu-Ser-Pro-Gly-Ser-Ile-Gly-Leu-Phe-Asn-Trp-Glu-Tyr-Trp-Val-Ile-Pro-Trp-Pro-Gly-Val-Gly-Phe-Asp-Met-Ala-Cys-Leu-Gln-Gly-Leu-Pro-Asp-Gln-Val-Leu-Gln-Gly-Leu-Glu-Ala-Phe-Trp-Phe-Lys-Gly-Asn-Trp-Leu-Ile-Ser-Gly-Gly-Leu-Gly-Arg-Cys-Ser-Ser-Pro-Arg-Thr-Ala-Gly-Ala-Cys-Ile-Gly-Lys-Ile-Thr-Gly-Gly-Leu-Phe-Ala-Ser-Gly-Arg-Tyr-Arg-Thr-Pro-Trp-His-Cys-Cys-Lys-Ala-Ser-Arg-Pro-Met-Met-Ala;

(IV)

Ser-Asp-Ala-Leu-Asp-Arg-Trp-Pro-Val-Gly-Arg-Asp-Asp-Val-Gly-Gly-Pro-Asn-Ile-Val-Pro-Gln-Arg-Trp-Gly-Thr-Ser-Arg-Leu-Val-His-Ser-Leu-Gln-Thr-Arg-Arg-Leu-Gly-Ile-Arg-Lys-Glu-Asp-Ser-Val-Gln-Thr-Leu-Gly-Ser-Gly-Leu-Ile-Ile-Ser-Met-Val-Asn-Phe-Val-Ser-Ala-Gly-Leu-Phe-Arg-Cys-Leu-Pro-Val-Ser-Cys-Pro-Glu-Asp-Leu-Leu-Val-Glu-Glu-Leu-Val-Asp-Gly-Leu-Leu-Ser-Leu-Glu-Glu-Glu-Leu-Lys-Asp-Lys-Glu-Glu-Glu-Glu-Ala-Val-Leu-Asp-Gly-Leu-Leu-Ser-Leu-Glu-Glu-Glu-Ser-Arg-Gly-Arg-Leu-Arg-Arg-Gly-Pro-Pro-Gly-Glu-Lys-Ala-Pro-Pro-Arg-Gly-Glu-Thr-His-Arg-Asp-Arg-Gln-Arg-Arg-Ala-Glu-Glu-Lys-Arg-Lys-Arg-Lys-Lys-Glu-Arg-Glu-Lys-Glu-Glu-Glu-Lys-Gln-Thr-Ala-Glu-Tyr-Leu-Lys-Arg-Lys-Glu-Glu-Glu-Lys-Ala-Arg-Arg-Arg-Arg-Arg-Arg-Ala-Glu-Lys-Lys-Ala-Ala-Asp-Val-Ala-Arg-Arg-Lys-Gln-Glu-Glu-Gln-Glu-Arg-Arg-Glu-Arg-Lys-Trp-Arg-Gln-Gly-Ala-Glu-Lys-Ala-Lys-Gln-His-Ser-Ala-Arg-Lys-Glu-Lys-Met-Gln-Glu-Leu-Gly-Ile-Asp-Gly-Tyr-Thr-Arg-Gln-Leu-Glu-Gly-Glu-Val-Glu-Ser-Leu-Glu-Ala-Glu-Arg-Arg-Lys-Leu-Leu-Gln-Glu-Lys-Glu-Asp-Leu-Met-Gly-Glu-Val-Asn-Tyr-Trp-Gln-Gly-Arg-Leu-Glu-Ala-Met-Trp-Leu-Gln; and

(V)

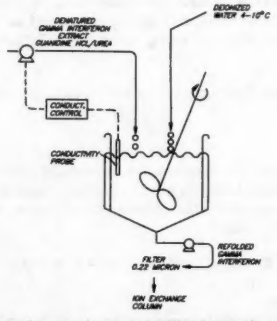
Gly-Pro-Cys-Gly-Glu-Gly-Asn-Phe-Ile-Glu-Glu-Phe-Phe-Tyr-Ser-Leu-Val-Gly-Asn-Ile-Gly-Glu-Glu-Gly-Pro-Glu-Leu-Ala-Gly-Val-Ala-Lys-Asn-His-Val-Gly-Gln-Glu-Gly-Pro-Gly-Asp-Gly-Gly-Gly-Lys-Leu-Val-Glu-Val-His-Ala-Asp-Asn-Gly-Ala-Ser-Pro-Glu-Gly-Val-Gln-Val-Leu-Gly-Pro-Glu-Ser-Gly-Val-Trp-Lys-Arg-Gln-Gly-Trp-Glu-Val-Leu-Pro-Lys-Gly-Gly-Phe-His-Val-Ser-Ile-Ser-Glu-Gly-Gly-Val-Phe-Ala-His-Gly-Leu-Glu-Glu-Gly-Gly-Trp-Asn-Val-Gly-Gly-Cys-Met-Ser-Asp-Trp-Arg-Gly-Lys-Asp-Leu-Glu-Gly-Leu-Arg-Gly-Ser-Leu-Gly-Gly-Glu-Gly-Gly-Glu-Ser-Arg-Asp-Lys-Glu-Leu.

4,999,422

CONTINUOUS METHOD OF REFOLDING PROTEINS

Parrish M. Galliher, Acton, Mass., assignor to Biogen, N.V., Boston, Mass.

Filed Apr. 15, 1988, Ser. No. 181,963
Int. Cl.[5] C07K *3/12, 3/28, 15/26, 15/08*
U.S. Cl. 530—351 **10 Claims**



1. A process for treating a solubilized protein to obtain the protein in a properly folded, biologically active conformation, the protein being selected from the group consisting of insulin, proinsulin, bovine, pancreatic ribonuclease, lysozyme, bovine pancreatic trypsin inhibitor, gamma interferon and other interferons, rennin, plasminogen activator, prolactin, human α-1

trypsin inhibitor, and Factor VIII, said process comprising the steps of:

(a) continuously feeding a solution of the solubilized protein concurrently with a diluent consisting essentially of water into a continuous flow reaction vessel under ideal mixing conditions which yield homogenous solutions without concentration gradients, in a ratio such that the concentration of the solublizing agent in the solubilized protein solution is diluted below an optimal dilution level wherein the solubilizing agent ceases to affect the conformation of the protein and the protein begins to refold into a biologically active conformation, and

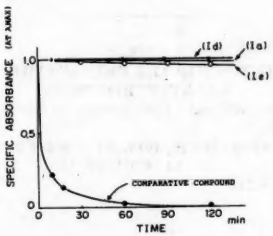
(b) continuously removing the protein solution from the vessel at a flow rate such that the average residence time of the protein in the vessel is sufficient for optimum protein refolding.

4,999,423

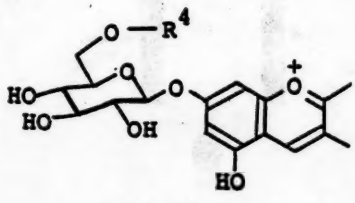
ACYLATED ANTHOCYANIN AND PROCESS FOR PRODUCING THE SAME AS WELL AS PIGMENT COMPOSITION CONTAINING THE SAME

Eiichi Idaka, Gifu, Japan, assignor to Suntory Limited, Osaka, Japan

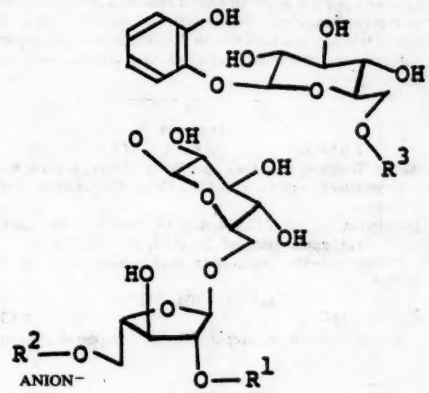
Filed Mar. 11, 1988, Ser. No. 167,269
Int. Cl.[5] C07G 3/00; C07H 15/00, 17/04
U.S. Cl. 536—4.1 **9 Claims**



1. A substantially pure acylated anthocyanin of the formula (I):



-continued



wherein R^1 and R^2 may be the same or different and each represents a hydrogen atom, a ferulyl group or a caffeyl group; R^3 and R^4 may be the same or different and each represents a ferulyl group or a caffeyl group; and ANION represents an anion; and wherein said acylated anthocyanin was extracted from fruits, leaves, stems or whole plants containing said acylated anthocyanin.

4,999,424

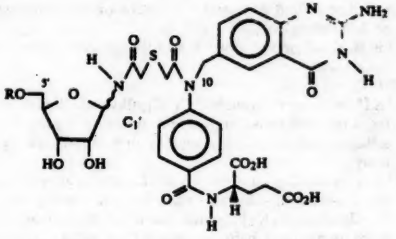
GAR TRANSFORMYLASE INHIBITOR

Stephen J. Benkovic, State College, Pa.; Richard A. Blatchly, Shelburne Falls, Mass., and James Inglese, E. Hanover, N.J., assignors to The Pennsylvania State University, State College, Pa.

Filed Nov. 10, 1988, Ser. No. 269,510
Int. Cl.[5] C07H 9/06; A61K 31/70, 31/395
U.S. Cl. 536—22 **17 Claims**

1. The compounds having the Formula (I):

(I)



wherein R=H, or PO_3, and pharmacologically acceptable salts thereof.

4,999,425

CELLULOSE AMINOMETHANATE BY ION-EXCHANGE EXTRACTION

Douglas J. Bridgeford, Champaign, Ill., assignor to Teepak, Inc., Westchester, Ill.

Filed Jun. 12, 1989, Ser. No. 365,275
Int. Cl.[5] C08B 3/00; A22C 13/00
U.S. Cl. 536—30 **17 Claims**

1. In a process for synthesizing cellulose aminomethanate, wherein cellulose, slurried in an aqueous urea containing, caustic steeping solution, is steeped to form a mixture of

swelled cellulose intermingled with urea, concentrated to remove a portion of the alkali and urea, and thereafter is heated to form cellulose aminomethanate, the improvement comprising extracting the concentrated mixture with an extracting solution and contacting the extracting solution with an ion exchanger.

4,999,426

PREPARATION OF 4-AZASACCHARINES

Adrian Waldner, Allschwil, and Willy Meyer, Riehen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

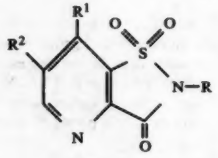
Division of Ser. No. 242,834, Sep. 12, 1988, Pat. No. 4,889,933. This application Jul. 26, 1989, Ser. No. 385,851

Claims priority, application Switzerland, Sep. 18, 1987, 3620/87

Int. Cl.[5] C07D *513/04*

U.S. Cl. 544—127 **2 Claims**

1. A process for the preparation of a compound of formula I



(I)

in which

R is H, linear or branched C_1–C_{20}alkyl, C_2–C_{20}alkenyl or C_2–C_{20}alkynyl, C_3–C_{10}cycloalkyl, C_4–C_{20}cycloalkylalkyl, C_4–C_{20}alkylcycloalkyl, C_5–C_{20}alkylcycloalkylalkyl, C_6–C_{14}aryl, C_7–C_{20}-aralkyl or -alkaryl or C_8–C_{20}-alkaralkyl, each of which is unsubstituted or substituted by —OH, —CN, halogen, C_1–C_{12}-alkoxy or -alkylthio, C_6–C_{10}aryl-oxy or -thio, C_7–C_{16}-aralkyloxy, -alkaryloxy, -aralkylthio or -alkarylthio, C_8–C_{18}alkaralkyloxy or -thio, —NR^3R^4, —$COOR^5$, —$OCOR^6$, —$CONR^3R^4$ or by —NR^3COR^6, in which each of

R^3 and R^4, independently of the other, is C_1–C_{12}alkyl, C_5- or C_6-cycloalkyl, C_6–C_{10}aryl, C_7–C_{16}aralkyl or C_8–C_{16}alkaralkyl or R^3 and R^4 together are tetra- or penta-methylene or 3-oxapentylene,

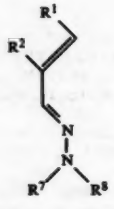
R^5 is H, C_1–C_{12}alkyl, phenyl, benzyl, cyclohexyl or cyclopentyl and

R^6 is C_1–C_{12}acyl,

R^1 is H, or linear or branched C_1–C_{12}alkyl which is unsubstituted or substituted by hydroxy, halogen, cyano, C_1–C_4alkoxy, carboxy, C_1–C_{12}acyloxy or by C_1–C_4alkoxycarbonyl,

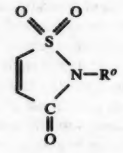
R^2 is H, or C_1–C_{12}-alkyl or -alkoxy, C_6–C_{10}-aryl or -aryloxy, C_7–C_{16}-aralkyl, -alkaryl, -alkaryloxy or -aralkyloxy, or C_8–C_{16}alkaralkyloxy, which are unsubstituted or substituted by hydroxy, halogen, cyano, C_1–C_4alkoxy, carboxy, C_1–C_{12}acyloxy or by C_1–C_4alkoxycarbonyl,

in which an azadiene of formula II



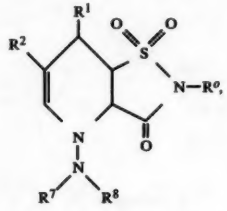
(II)

in which each of R^7 and R^8, independently of the other, has the same meanings as R^3 and R^4, is reacted with a compound of formula III



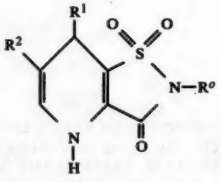
(III)

in which R^o has the same meaning as R, with the exception of H, to form a compound of formula IV



(IV)

the compound of formula IV is converted into a compound of formula V



(V)

by treatment with an acid and/or by thermal treatment with removal of R^7R^8NH, the compound of formula V is oxidized to a compound of formula I, and, for the preparation of compounds of formula I in which R is H, the compound of formula V is reacted with a strong acid.

4,999,427

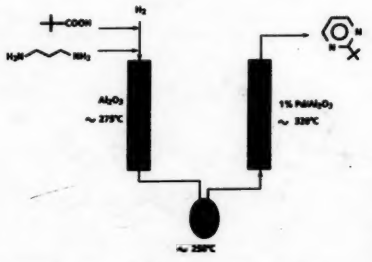
PROCESS FOR THE PREPARATION OF 2-ALKYLPYRIMIDINES

John Hull, Jr., Midland, Mich., assignor to DowElanco, Indianapolis, Ind.

Filed May 16, 1988, Ser. No. 195,043

Int. Cl.[5] C07D *239/26*

U.S. Cl. 544—242 **4 Claims**



1. A process for preparing a 2-(C_1–C_4) alkylpyrimidine

directly from 1,3--diaminopropane and a (C_1–C_4) alkanecarboxylic acid which comprises the steps of:

(a) contacting in the vapor phase from about one to about two molar equivalents of 1,3- -diaminopropane with about one molar equivalent of (C_1–C_4)alkanecarboxylic acid in the presence of a hydrogen diluent at a temperature from about 220° C. to about 300° C. over an alumina or silica catalyst;

(b) reducing the level of N,N'-1,3- -propanediylbis-((C_1–C_4.)alkanecarboxylic acid amide); and

(c) passing the resultant stream in the vapor phase at a temperature from about 280° C. to about 400° C. over a supported platinum or palladium catalyst.

4,999,428

PROCESS FOR PREPARING CYCLOPENTYL PURINE DERIVATIVES

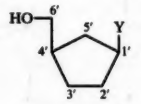
Anil K. Saksena, Upper Montclair; Viyyoor M. Girijavallabhan, Parsippany, and Ashit K. Ganguly, Upper Montclair, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Filed Apr. 14, 1989, Ser. No. 338,244

Int. Cl.[5] **C07D** *473/34, 473/18, 473/04, 473/30*

U.S. Cl. 544—277 **14 Claims**

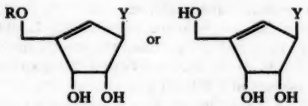
1. Method for preparing a 6'-hydroxycyclopentyl derivative of the formula:



(X)

wherein Y is purine or modified purine which is adenin-9-yl, hypoxanthin-9-yl, guanin-9-yl, and xanthin-9-yl and bound via the nitrogen atom at the 9-position in the purine or the modified purine comprising:

(a) contacting at least on compound of the formula:



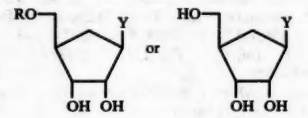
(I') (II')

wherein

Y is as defined hereinbefore,

R is alkyl, alkenylalkyl, alkynylalkyl, alkoxyalkyl, dialkylaminoalkyl, alkylthioalkyl, benzyl, alkylbenzyl, alkoxybenzyl, phenyl, alkoxyphenyl, alkylphenyl, cycloalkyl, cycloalkalkyl or —COR^7,

with a first hydrogenating agent to give at least one 2',3'-dihydroxy cyclopentyl derivative of the formula:



(I) (II)

wherein

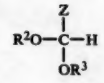
Y is as defined hereinbefore,

R is alkyl, alkenylalkyl, alkynylalkyl, alkoxyalkyl, dialkylaminoalkyl, alkylthioalkyl, benzyl, alkylbenzyl, alkoxybenzyl, phenyl, alkoxyphenyl, alkylphenyl, cycloalkyl, cycloalkalkyl, or —COR^7,

wherein

R^7 is alkyl, benzyl, alkylbenzyl, alkoxybenzyl, phenyl, alkylphenyl, cycloalkyl or cycloalkalkyl,

(b) contacting at least one 2',3'-dihydroxy cyclopentyl derivative of the formulas (I) or (II) with a compound of the formula:



(III)

wherein

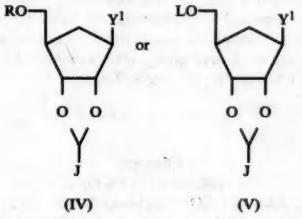
R^2 and R^3 independently represent C-1 to C-3 alkyl;

Z represents

—OR^1 wherein R^1 represents the same values as for R^2 or R^3, or

—NR^4R^5 wherein R^4 and R^5 independently represent hydrogen or the same values for R,

in the presence of an acid catalyst to yield at least one 2',3'-cyclic ortho ester of the formula:



(IV) (V)

wherein

R is as defined hereinbefore,

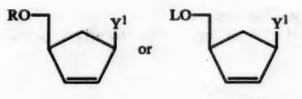
J represents —OR^1 or —NR^4R^5, and

L represents hydrogen, —$CHOR^1OR^2$, —$CHOR^1OR^3$, —$CHOR^2OR^3$, —$CHOR^1NR^4R^5$, —$CHOR^2NR^4R^5$, —$CHOR^3NR^4R^5$ or —CHO,

Y^1 is the same as Y with the proviso that any free amino function (i.e. —NH_2) present in Y can be the Schiff base, —N=CHZ, or —$NHCHOR^2NR^4R^5$, —$NHCHOR^3NR^4R^5$, or —$NHCHOR^2OR^3$

wherein Z, R^1, R^2, R^3, R^4 and R^5 are as defined hereinbefore;

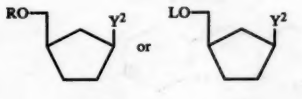
(c) contacting at least one 2',3'-cyclic ortho ester from step (b) with an anhydride under substantially anhydrous conditions to yield at least one 2',3'-dehydro derivative of the formula:



(VI) (VII)

(d) for those derivatives of Y^1 having the Schiff base —N=CHZ, hydrolyzing the Schiff base to reform the free amino function;

(e) contacting at least one 2',3'-dehydro derivative from step (c) or (d) with a hydrogenating agent to yield at least one cylcopentyl analogue of the formula:



(VIII) (IX)

wherein R and L are as defined hereinbefore and

Y^2 is the same as Y with the proviso that the amino function is free or —NHCHOR^{2}NR^{4}R^5, —NHCHOR^{3}NR^{4}R^5 or —NHCHOR^{2}OR^3;

(f) hydrolyzing at least one cyclopentyl analogue from step (e) to the 6'-hydroxy cyclopentyl derivative of formula (X).

4,999,429

PROCESS FOR THE PREPARATION OF α,α,β-1-TRIFLUORO-1-OLEFINIC DERIVATIVES

G. Patrick Stahly, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Division of Ser. No. 294,301, Jan. 9, 1989, abandoned. This application Nov. 13, 1989, Ser. No. 435,666

Int. Cl.^{5} C07D *211/70, 209/04, 215/18;* **C07F** *59/76, 62/38, 9/06, 9/22, 9/28*

U.S. Cl. 546—21 **11 Claims**

1. A process for the preparation of α, α, β-trifluoro-1-olefinic compounds of the formula RCF=CF_2 which comprises treating a compound of the formula RCHFCF_2SO_2Ar where R is an aryl, cycloaliphatic, sec or tert-aliphatic or heterocyclic group and Ar is an aryl group with a catalytically effective amount of 1,8-diazobicyclo undec-7-ene.

4,999,430

DERIVATIVES OF 1,2,3,4-TETRAHYDRO-9-ACRISINAMINE

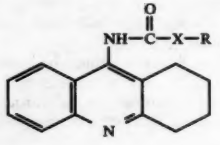
Jeffrey A. Kester; Walter H. Moos, and Anthony J. Thomas, all of Ann Arbor, Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Jul. 31, 1989, Ser. No. 387,722

Int. Cl.^{5} C07D *219/10;* **A01N** *43/42*

U.S. Cl. 546—105 **12 Claims**

1. A compound of Formula I

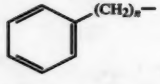


I

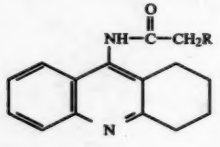
wherein

X is O or CH_2; and

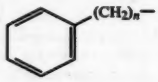
R is alkyl of from one to twenty carbon atoms, or



wherein n is zero or an integer of one to twenty with the exclusion of the compound of Formula



wherein R is alkyl of from one to four or



wherein n is 0 or an integer of one to two; or a pharmaceutically acceptable acid addition salt thereof.

4,999,431

PROCESS FOR PREPARING QUINOLINE ALDEHYDE AND KETONE DERIVATIVES

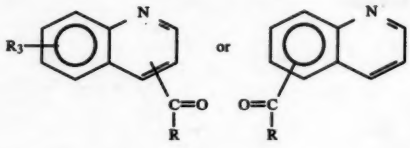
Winton D. Jones; Richard C. Dage; George P. Claxton; Hsien C. Cheng, all of Cincinnati, Ohio, and Phillip J. Robinson, Fitzroy, Australia, assignors to Merrell Dow Pharmaceuticals, Cincinnati, Ohio

Division of Ser. No. 411,439, Sep. 22, 1989, abandoned, which is a division of Ser. No. 261,435, Oct. 24, 1988, Pat. No. 4,886,811. This application Feb. 23, 1990, Ser. No. 483,831

Int. Cl.^{5} C07D *215/14*

U.S. Cl. 546—168 **1 Claim**

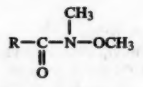
1. A process for preparing a compound of the formula



wherein

R is hydrogen, C_1–C_6 alkyl and c_1–C_3 alkylphenyl wherein the phenyl ring is optionally substituted with one, two or three of the substitutents selected from the group consisting of fluorine, chlorine, bromine, C_1–C_4 alkyl, and C_1–C_4 alkoxy nitro and trifluoromethyl; and

R_3 is an optional substitutent selected from the group consisting of fluorine, chlorine, bromine, C_1–C_4 alkyl, C_1–C_4 alkoxy, nitro, and trifluoromethyl, which comprises reacting a 2-, 3-, 4-, or a 5-, 6-, 7- or 8-bromoquinoline with butyl lithium in a solvent at a temperature of from −70° C. to 0° C., and then further reacting the lithiated compound with a compound of the formula



4,999,432

FLUORINATION WITH HYDROGEN FLUORIDE

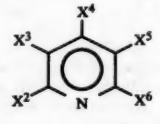
David D. Friese, Antioch, and Jerry M. Elledge, Martinez, both of Calif., assignors to DowElanco, Indianapolis, Ind.

Filed Aug. 28, 1989, Ser. No. 399,748

Int. Cl.^{5} C07D *213/61, 213/84*

U.S. Cl. 546—286 **12 Claims**

1. A process which comprises preparing a fluoropyridine compound of the general formula



wherein

X^2, X^3, X^4, X^5, and X^6 each independently represent F, Cl, CF_3, CHF_2, CN, H, or CH_3 with the provisos that at least one of X^2, X^4, and X^6 represents F and no more than two of X^2, X^3, X^4, X^5, and X^6 represent H or CH_3

by heating a mixture of a chloropyridine compound of the same general formula wherein

X^2, X^3, X^4, X^5, and X^6 each independently represent F, Cl, CF_3, CHF_2, CN, H, or CH_3 with the provisos that at least one of X^2, X^4, and X^6 represents Cl and no more than two of X^2, X^3, X^4, X^5, and X^6 represent H or CH_3,

hydrogen fluoride, and a dipolar, aprotic solvent to a temperature of between about 160° C. and about 300° C. and a pressure of between about 100 and about 7,000 kiloPascals for a sufficient amount of time to exchange at least one chlorine substituent in a 2-, 4-, or 6-position with fluorine, and, optionally recovering the fluoropyridine compound.

4,999,433
PROCESS FOR THE PREPARATION OF BENZOTRIAZOLE DERIVATIVES

Helmut Prestel, Bruchsal, and Klaus Müller, Lorsch, both of Fed. Rep. of Germany, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

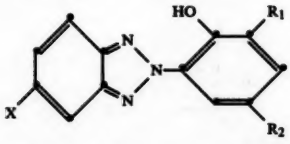
Filed Sep. 26, 1989, Ser. No. 412,370

Claims priority, application Switzerland, Sep. 28, 1988, 3594/88

Int. Cl.[5] C07D *249/20*

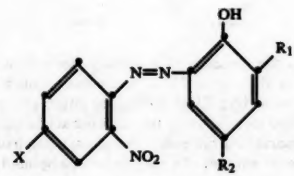
U.S. Cl. 548—260 18 Claims

1. A process for the preparation of a 2-(2-hydroxyphenyl)-2H-benzotriazole of the formula



I,

in which X is chloro, R_1 is hydrogen, C_1–C_{14}alkyl, C_5–C_6cycloalkyl, phenyl or phenyl-C_1–C_4alkyl and R_2 is C_1–C_{12}alkyl, C_5–C_6cycloalkyl, phenyl, phenyl-C_1–C_4alkyl group $—C_nH_{2n}—COOR_3$, in which n is 0 to 4 and R_3 is hydrogen or C_1–C_{12}alkyl, by catalytic hydrogenation of an azo compound of the formula



II

in the presence of a Pt hydrogenation catalyst and an organic amine, wherein the hydrogenation catalyst used is 0.1 to 3% Pt on a support.

4,999,434
PROCESS FOR LOW CHLORIDE 1,2,4-TRIAZOL-5-ONE

Max M. Boudakian, Pittsford, and Delmer A. Fidler, Rochester, both of N.Y., assignors to Olin Corporation, Cheshire, Conn.

Filed Sep. 28, 1987, Ser. No. 101,465

Int. Cl.[5] C07D *249/08*

U.S. Cl. 548—263.2 10 Claims

1. A process for producing 1,2,4-triazol-5-one which comprises reacting semicarbazide or a salt thereof with a formic acid formulating agent selected from the group consisting of formic acid, formic acid esters of a lower alcohol having 1 to 6 carbon atoms, and orthoformic acid esters of a lower alcohol having 1 to 6 carbon atoms in the presence of a catalytic amount of a sulfur-oxygen containing acid selected from the group consisting of sulfuric acid, oleum and sulfurous acid.

4,999,435
N-ALKYL-6,7-DIHYDROXY BENZIMIDAZOLIUM SALTS

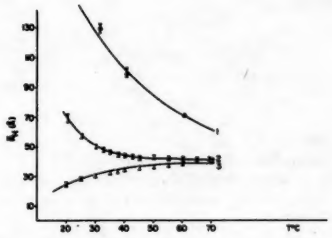
Henrich H. Paradies, Iserlohn, Fed. Rep. of Germany, assignor to Medice Chem.-Pharm. Fabrik Putter GmbH & Co. KG, Fed. Rep. of Germany

Division of Ser. No. 83,476, Aug. 6, 1987, Pat. No. 4,870,174. This application Jul. 24, 1989, Ser. No. 384,352

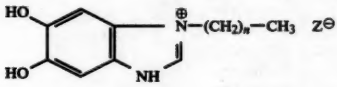
Claims priority, application Fed. Rep. of Germany, Aug. 7, 1986, 3626700

Int. Cl.[5] C07D *235/06*

U.S. Cl. 248—326 1 Claim



1. A compound having the formula



in which:

$Z^{\ominus}$ is an anion selected from the group consisting of chloride, bromide, iodide, maleate, formate, acetate, propionate, hydrogen sulfate, malate, fumarate, salicylate, alginate, gluconate, glucoronate, galactoronate, ethyl sulfate and $H_2PO_4^-$; and

n is 8 to 20.

4,999,436
ARYL-SUBSTITUTED THIOPHENE 3-OLS, DERIVATIVES AND ANALOGS USEFUL AS LIPOXGENASE INHIBITORS

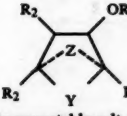
Bruce E. Witzel, Westfield; Debra L. Allison, Basking Ridge; Charles G. Caldwell, Scotch Plains, and Kathleen Rupprecht, Cranford, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 222,358, Jul. 20, 1988, abandoned, which is a continuation of Ser. No. 99,586, Sep. 22, 1987, abandoned. This application Aug. 22, 1989, Ser. No. 397,325

Int. Cl.[5] C07D *333/74*

U.S. Cl. 549—45 4 Claims

1. A thiophene derivative of the formula:



I

or a physiologically acceptable salt thereof, wherein Z represents the number of double bonds in the 5-membered ring and Z=1 or 2; Y is S;

R_1 is

(a) H;

(b)

wherein R_3 is C_{1-6} alkyl, aryloxy, loweralkoxy, lower alkylthio, monoloweralkylamino, diloweralkylamino, loweralkoxy loweralkyl, or carboloweralkoxy loweralkyl;

(c)

wherein R_4 is naphthyl, anthryl, or substituted phenyl of formula

wherein X_5 and X_6 independently are:

(1) Q, where Q is H, C_{1-6} alkyl, fluoro or chloro C_{1-6} alkyl, phenyl or substituted phenyl, or naphthyl;
(2) halo;
(3) C_{2-6} alkynyl;
(4) C_{2-6} alkenyl;
(5) —SQ;
(6) —OQ;
(7) —CHQCOQ[1], wherein Q^1 is any species of Q and can be the same as or different from Q;
(8) —CHQCOOQ[1];
(9) —CH_2SQ or —CHQSQ[1];
(10) —CH_2OQ or —CHQOQ[1];
(11) —COQ;
(12) —COOQ;
(13) —OCOQ;
(14) —CQQ[1];
(15) —NQCOQ[1];
(16) —NQ(OQ[1]);
(17) —NQ(SQ[1]);
(18) —$NQSO_2Q^1$;
(19) —SO_2NQQ^1;
(20) —SOQ;
(21) —SO_2Q;
(22) —SO_3Q;
(23) —CN;
(24) —NO_2;
(25) —CONQQ[1];
(26) —NO;
(27) —CSQ;
(28) —CSNQQ[1];
(29) —CF_2SQ;
(30) —CF_2OQ;
(31) —NQCONHQ[1] or NQCONQ[1]Q[2]

wherein Q^2 is any species of Q and Q^1 is any species of Q, and Q^2 can be the same as or different from Q^1;

(d)

(e) —R_3—OR_3;
(f) —R_3—S—R_3; or
(g) QOQ[1]; and

R_2 in the 2-position of the thiophene is

(a) R_4; or
(b) heteroaryl substituted with X_5 and X_6 and selected from the group consisting of pyridyl, pyrryl, furyl and thienyl, wherein X_5 and X_6 are as previously defined; and R_2 in the 4- and 5-position of the thiophene forms, a bridged alkylene of between 3 and 10 carbon atoms or a bridged alkylene of between 3 and 10 carbon atoms including a phenyl group fused to an alpha and beta carbon thereof.

4,999,437

PREPARATION OF ASCORBIC ACID 2-PHOSPHATE AND OF 5, 6-ISOPROPYLIDENEASCORBIC ACID AND POTASSIUM MAGNESIUM L-ASCORBATE 2-PHOSPHATE AS AN ADVANTAGEOUS SALT OF L-ASCORBIC ACID 2- PHOSPHATE

Walter Dobler, Heidelberg; Joachim Paust, Neuhofen, and Roland Betz, Niederkirchen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

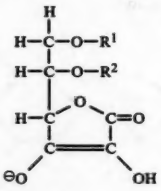
Filed Mar. 1, 1990, Ser. No. 486,755

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1989, 909198

Int. Cl.[5] C07F 9/06

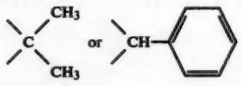
U.S. Cl. 549—222 **10 Claims**

1. A process for the preparation of ascorbic acid 2-phosphate by reacting ascorbic acid or an ascorbic acid derivative which has a group of the formula I



(I)

where R^1 and R^2 are each hydrogen or together form one of the groups



with $POCl_3$ in the presence of a tertiary amine in a suitable aqueous solvent at −10° to 25° C. while maintaining a pH of about 8–13.5, by adding KOH during the entire phosphorylation reaction, and then isolating the ascorbic acid 2-phosphate, wherein, to separate off the excess inorganic phosphate, about the stoichiometric amount of a magnesium compound, advantageously in the form of an aqueous solution, is added to the reaction mixture obtained in the phosphorylation, directly and without prior treatment with an ion exchanger, at a pH>7, until the formation of crystalline $KMgPO_4$ is complete, the $KMgPO_4$ which is crystallized out is separated off and the ascorbic acid phosphate is isolated from the filtrate in a conventional manner.

8. Potassium magnesium L-ascorbate 2-phosphate.

10. A process for the preparation of 5,6-isopropy-lideneascorbic acid by reacting ascorbic acid with acetone, wherein the ascorbic acid is treated, at from −10° to +10° C. for from 5 to 6 hours, with a mixture obtained by adding from 0 to 65% strength by weight oleum to acetone containing from 0 to 5% by weight of water at from −30° to +40° C. while stirring, and the 5,6-isopropy-lideneascorbic acid which crystallizes out is separated off at about −15° C., if necessary after washing with ice-cooled acetone.

4,999,438

PROCESS FOR THE REDUCTION OF THE POLYMER PORTION IN THE DIMERIZATION OF KETENE

Renzo Bergmin, Raron; Wilhelm Quittmann, Visp, and Josef Stoffel, Visperterminen, all of Switzerland, assignors to Lonza Ltd., Gampel, Switzerland

Filed Jan. 3, 1990, Ser. No. 460,659
Claims priority, application Switzerland, Jan. 5, 1989, 30/89
Int. Cl.[5] C07D *305/12*
U.S. Cl. 549—329 3 Claims

1. Process for the reduction of the polymer portion in the dimerization of ketene, which is produced by the catalytic pyrolysis of acetic acid, characterized in that sulfur dioxide as an inhibitor is added in an amount which provides a concentration of 10 to 6000 ppm in the reaction medium of the dimerization or in the crude ketene gas before dimerization.

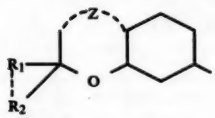
4,999,439

ALKYL-SUBSTITUTED TETRA- OR HEXAHYDROBENZOPYRAN DERIVATIVES, ORGANOLEPTIC USES THEREOF AND PROCESS FOR PREPARING SAME

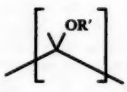
Mark A. Sprecker, Sea Bright; Robert P. Belko, Woodbridge; Marie R. Hanna, Keyport; Charles E. J. Beck, Summit, and Salvatore M. Brucato, Carteret, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Mar. 22, 1990, Ser. No. 497,693
Int. Cl.[5] C07D *311/00*
U.S. Cl. 549—397 15 Claims

1. At least one alkyl-substituted tetra- or hexahydrobenzopyran derivative defined according to the structure:



wherein Z is a moiety selected from the group consisting of:



and

;

wherein in the moiety:

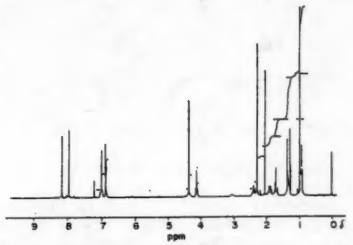
one of the dashed lines represents a carbon-carbon double bond and each of the other of the dashed represent carbon-carbon single bonds; wherein R′ is hydrogen methyl or ethyl; wherein R_1 and R_2 taken separately are the same or different hydrogen or C_1–C_3 alkyl or R_1 and R_2 taken together complete a C_5 or C_6 cycloalkyl moiety with the proviso that R_1 and R_2 are not both hydrogen.

4,999,440

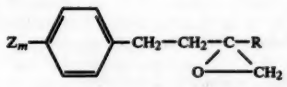
FUNGICIDAL HYDROXYALKYL-TRIAZOLYL DERIVATIVES

Graham Holmwood, Wuppertal; Udo Kraatz, Leverkusen; Karl H. Büchel, Burscheid; Wilhelm Brandes, Leichlingen; Stefan Dutzmann, Duesseldorf, and Paul Reinecke, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 190,733, May 5, 1988, Pat. No. 4,894,383. This application Aug. 17, 1989, Ser. No. 395,233
Claims priority, application Fed. Rep. of Germany, May 18, 1987, 3716559
Int. Cl.[5] C07D *303/12, 303/08*
U.S. Cl. 549—556 2 Claims

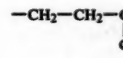


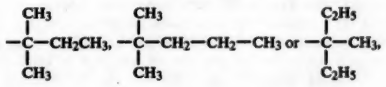
1. An oxirane of the formula



in which

R represents a radical of the formula $-CH_2-CH(CH_3)_2$, $-(CH_2)_4-CH_3$, $-(CH_2)_5-CH_3$, $-(CH_2)_6-CH_3$,





Z represents fluorine, chlorine, methyl, trifluoromethoxy or methoximinomethyl, and

m represents 0 or 1.

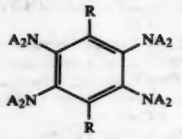
4,999,441

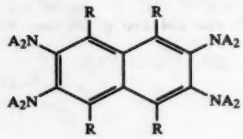
TETRAKIS(DIALKYLAMINO)AROMATICS AND THEIR CHARGE TRANSFER COMPLEXES

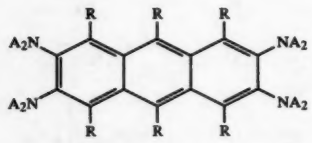
Heinz A. Staab, Heidelberg, and Karin Elbl, Neckarsulm, both of Fed. Rep. of Germany, assignors to Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V., Goettingen, Fed. Rep. of Germany

Continuation of Ser. No. 97,112, Sep. 16, 1987, abandoned. This application Apr. 17, 1989, Ser. No. 339,868
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1986, 3631614
Int. Cl.[5] C07C *225/24, 255/31, 255/58*
U.S. Cl. 552—291 4 Claims

1. A charge transfer complex comprising an electron donor of the formula Ia, Ib or Ic


(Ia)


(Ib)


(Ic)

where the radicals A may be identical or different and are n-C_1-C_6-alkyl and the radicals R may be identical or different and are hydrogen or C_1-C_6-alkyl, and an electron acceptor selected from an anion selected from the group consisting of halides, nitrate, perchlorate, tetrafluoroborate, hexafluorophosphate, hexafluoroarsenate or an anioin of acetic acid, benzoic acid, terephthalic acid or p-toluensulfonic acid or a compound selected from the group consisting of tetracyano-p-quinodimethane, tetrachloro-o-benzoquinone, dicyanodichloro-p-benzoquinone, tetracyanoethylene or tetracyanobenzene.

4,999,442

ORGANO-TITANIUM COMPOUNDS AND SURFACE TREATING AGENTS

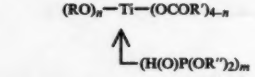
Masayuki Sato, Tokyo; Noriyuki Kobayashi, Ichihara; Akihiko Funamoto, Abiko, and Yoshitoshi Katsuoka, Ichihara, all of Japan, assignors to Nippon Soda Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 66,360, Jun. 8, 1987. This application Jun. 22, 1989, Ser. No. 369,812

Int. Cl.[5] C07F 7/28

U.S. Cl. 556—14 **2 Claims**

1. An organic titanium compound represented by the following following formula (I)


(I)

wherein Rs are the same or different radicals selected from the group consisting of alkyl radicals and alkenyl radicals, having from 1 to 8 carbon atoms,

R's are the same or different radicals selected from the group consisting of alkyl radicals and alkenyl radicals and aryl radicals, substituted or not substituted, having from 1 to 22 carbon atons,

R''s are the same or different radicals selected from the group consisting of alkyl radicals, alkenyl radicals and aryl radicals, substituted or not substituted, having from 3 to 22 carbon atoms,

n is an integer from 1 to 3, and

m is 1 to 2.

4,999,443

TRANSITION METAL COMPLEXES

Werner Bertleff, Viernheim; Dieter Koeffer, Weinheim, both of Fed. Rep. of Germany; Wolfgang Klaeui, Vaals, Netherlands, and Choong-Eui Song, Seoul, Rep. of Korea, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

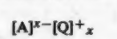
Filed Jun. 2, 1989, Ser. No. 360,863

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819487

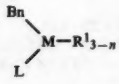
Int. Cl.[5] C07F 15/00, 15/08, 9/66, 1/00

U.S. Cl. 556—136 **7 Claims**

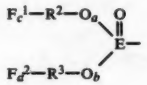
1. transition metal complex of the formula I


I

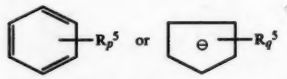
where Q is one equivalent of a cation, x is from 0 to 2 and A is a transition metal complex of the formula


A

where n is from 1 to 3, M is positively charged cobalt, rhodium, iridium or ruthenium, the groups B are identical or different groups of the formula II


II

where E is phosphorus or arsenic, O is oxygen, R^2 and R^3 are each C_1-C_{20}-alkylene which in turn may carry up to two cycloalkyl, heterocycloalkyl, aryl or hetaryl groups having a total of not more than 15 ring atoms, and R^2 and R^3 may be interrupted by oxygen, sulfur or (—NR^4), R^4 is hydrogen or C_1-C_4-alkyl and the heteroatoms or heteroatom groups are each separated by two or more carbon atoms and the radicals R^4 derived from two different (—NR^4) groups may furthermore be bonded to one another to form a 5-membered or 6-membered ring, F^1 and F^2 are each alkenyl, alkynyl, C_5-C_{12}-cycloalkadienyl, nitrile, amino, C_1-C_4-mono- and dialkylamino, C_1-C_4-acyl, hydroxyl, C_1-C_4-alkoxy, aryloxy, C_1-C_4-alkylsulfido, arylsulfido, C_1-C_4-dialkyland and diarylphosphido and/or carboxylato, a-d are each 0 or 1, with the proviso that a+b>0 and c+d>0, L is



the radicals R^5 are identical or different radicals from the group consisting of C_1-C_4-alkyl and phenyl, p is an integer from 0 to 6 and q is an integer from 0 to 5, and R^1 is fluorine, chlorine, bromine, iodine, cyanide, isocyanide, cyanate, isocyanate, thiocyanate, isothiocyanate, C_1-C_4-alkyl, C_1-C_4-trialkyl phosphite or triaryl phosphite.

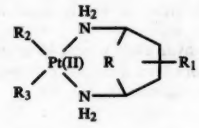
4,999,444

NOVEL NEUTRAL MIXED LIGAND PLATINUM(II) AND PLATINUM(IV) COMPLEXES

James D. Hoeschele, Canton, and Leslie M. Werbel, Ann Arbor, both of Mich., assignors to Warner-Lambert Co., Morris Plains, N.J.

Filed Mar. 10, 1989, Ser. No. 321,818
Int. Cl.[5] C07F *15/00*; A01N *55/02*; A61K *31/28*
U.S. Cl. 556—137 6 Claims

1. A neutral ligand platinum (II) complex of formula I



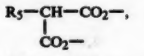
I

or a pharmaceutically acceptable acid addition salt thereof, wherein R is

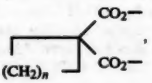
$-(CH_2)_n-$, in which n is an integer from two to three;

R_1 is hydrogen, carboxyl, an alkyl group of from one to four carbon atoms, an alkyl group of from one to four carbon atoms substituted with alkoxy of from one to four carbon atoms, a cycloalkyl group of from three to six carbon atoms, a hydroxyl group of from one to four carbon atoms, an alkoxy group of from one to four carbon atoms, or benzyl;

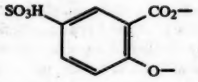
and R_2 and R_3 are negatively charged monodentate ligands which may be the same or different and are selected from the group consisting of chloro, bromo, iodo, nitrato, and acetato or R_2 and R_3 taken together form a dinegatively charged bidenate ligand selected from the group consisting of sulfato, oxalato,



in which R_5 is hydrogen, hydroxyl, amino, an alkyl group of from one to four carbon atoms or an aminoalkyl group of from one to four carbon atoms,



in which n is an integer from one to three, and



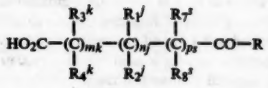
4,999,445

CONTRAST AGENTS FOR MAGNETIC RESONANCE IMAGING OF THE SMALL INTESTINE AND HEPATOBILIARY SYSTEM

David L. White, Oakland; Barry L. Engelstad, Orinda, and Kurt A. Muetterties, Oakland, all of Calif., assignors to The Regents of the University of California, Oakland, Calif.

Filed Jun. 10, 1988, Ser. No. 205,201
Int. Cl.[5] C07F *15/02*
U.S. Cl. 556—138 4 Claims

1. A metal complex comprising a metal ion selected from the group consisting of Fe(III), Dy(III), Gd(III), Cr(III) and Mn(II) and a ligand of the formula



wherein R is -desferrioxamine B; j is an integer from 1 to n; k is an integer from O to m; s is an integer from O to p; p+n+m is less than or equal to 18; each R_1^j is independently aryl of 6 to 14 carbon atoms, or substituted aryl having at least one substituent selected from the group consisting of halo, alkyl of 1 to 6 carbon atoms, nitro, sulfonyl, hydroxyl, alkoxy of 1 to 6 carbon atoms, carboalkoxy of 2 to 6 carbon atoms, alkoxycarbonyl of 2 to 6 carbon atoms and sulfhydryl; and each R_2^j, R_3^k, R_4^k, R_7^s and R_8^s is independently hydrogen, aryl or substituted aryl as defined above.

4,999,446

TRIMETHOXYSILANE PREPARATION VIA THE METHANOL-SILICON REACTION WITH RECYCLE

Lawrence G. Moody, Marietta; Thomas E. Childress, Newport, both of Ohio; Robert L. Pitrolo, Parkersburg, W. Va.; James S. Ritscher, and Ronald P. Leichliter, both of Marietta, Ohio, assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed Jun. 21, 1990, Ser. No. 541,516
Int. Cl.[5] C07F *7/04*
U.S. Cl. 556—470 38 Claims

1. A process for producing trimethoxysilane comprising:

(1) introducing methanol into a reactor containing a slurry of silicon metal and a catalytically effective amount of a copper catalyst which reactor is maintained at a temperature of at least 180° C.;

(2) reacting the methanol and silicon metal while maintaining the percent methanol conversion at least 60% to form a reactor product containing essentially trimethoxysilane-methanol azeotrope and trimethoxysilane;

(3) introducing the reactor product immediately to a column wherein the reactor product is distilled to form (i) a lites stream containing predominantly the trimethoxysilane-methanol azeotrope and (ii) a heavies stream containing predominantly trimethoxysilane;

(4) recycling said lites stream from the column to the reactor; and

(5) removing said heavies stream from the column.

4,999,447

PREPARATION OF ALKYL SILANES

Gunner E. Nelson, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 198,514, May 24, 1988, Pat. No. 4,916,245, and Ser. No. 129,001, Dec. 3, 1987, Pat. No. 4,845,260, which is a continuation-in-part of Ser. No. 17,852, Feb. 24, 1987, Pat. No. 4,711,965. This application May 1, 1989, Ser. No. 346,232
Int. Cl.[5] C07F *7/08*
U.S. Cl. 556—478 20 Claims

1. A process for the preparation of a mixture of tetraalkylsilanes, said process comprising contacting reactants (a), (b), and (c) at a reaction temperature, wherein:

reactant (a) is an alkali metal aluminum tetraalkyl having the formula $MAlR'_4$ wherein M is an alkali metal selected from the class consisting of lithium, sodium, and potassium, R' is an alkyl radical having from about 8 to about 14 carbon atoms, and the radicals depicted by R' are alike or different:

reactant (b) is an alkylhalosilane having two halo groups per molecule selected from fluoride, chloride, and bromide, and each alkyl group having from 1 to about 4 carbon atoms; and

reactant (c) is an olefin to which an alkyl radical R′ corresponds, wherein R′ has the same significance as above; such that the mole ratio of reactant (a) to reactant (b) is from about 0.5:1.0 to about 1:1, and the ratio of reactant (c) to reactant (a) is selected to confer in said product mixture of tetraalkylsilanes, the desired concentration of alkyl radicals derived from said olefin.

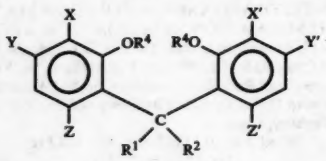
4,999,448

METHOD OF PREPARING BIS-PHENOL ETHERS

Michael G. Smith, Walnut Creek; James M. Renga, Santa Rosa; Brian K. Riley, Santa Rosa; Patricia G. Ray, Walnut Creek, and Charles Marlowe, San Francisco, all of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Apr. 12, 1990, Ser. No. 508,208
Int. Cl.[5] C07C *255/00, 43/205*
U.S. Cl. 558—411 **9 Claims**

1. A method of preparing a compound of the formula



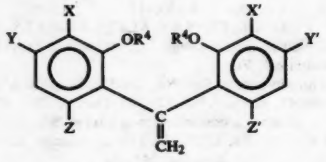
wherein

R^1 and R^2 together represent the fragment $—CH_2CH_2—$;

each R^4 independently represents C_1–C_4 alkyl optionally substituted with 1 or 2 C_1–C_4 alkoxy groups; and

X, X′, Y, Y′, Z, and Z′ each, independently represent H, F, Cl, Br, I, CN, NO_2, C_1–C_4 alkyl, C_1–C_4 alkoxy, phenoxy, C_1–C_4 alkylthio, phenylthio, or C_1–C_4 dialkylamino, wherein each alkyl, alkoxy, and alkylthio group is optionally substituted with one or more compatible groups selected from C_1–C_4 alkoxy, C_1–C_4 alkylthio, F, Cl, Br, CN, and phenyl and wherein each phenyl group is optionally substituted with up to 3 groups selected from F, Cl, Br, CN, CF_3, C_1–C_4 alkyl, and C_1–C_4 alkoxy

which comprises contacting thioanisole with a C_1–C_8 alkyl lithium reagent and an aliphatic tertiary amine in a compatible solvent to form a phenylthiomethyl lithium reagent and subsequently contacting said phenylthiomethyl lithium reagent with a compound of the formula



wherein R^4, X, X′, Y, Y′, Z, and Z′ are defined as hereinbefore under conditions conducive to the reaction.

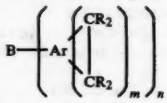
4,999,449

NOVEL POLY(ARYLCYCLOBUTENES)

Robert A. Kirchhoff, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 883,240, Jul. 8, 1986, abandoned, which is a continuation-in-part of Ser. No. 644,836, Aug. 27, 1984, abandoned. This application Jun. 2, 1989, Ser. No. 361,016
Int. Cl.[5] C07C *69/76*
U.S. Cl. 560—8 **10 Claims**

1. A poly(arylcyclobutene) which comprises a compound which corresponds to the formula



wherein

B is X—Z—$_n$;

R is separately in each occurrence hydrogen, an electron-withdrawing substituent or an electron-donating substituent;

X is an n valent hydrocarbon poly-yl or a hydrocarbon poly-yl which contains a heteroatom of oxygen, phosphorus, sulfur, or nitrogen;

Z is

Ar is an aromatic radical which may be substituted with an electron-withdrawing substituent or electron-donating substituent;

m is an integer of 1 or greater; and

n is an integer of 2 or greater.

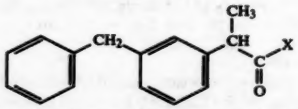
4,999,450

PROCESS FOR PREPARING ALPHA-(3-BENZYLPHENYL) PROPIONIC ACID DERIVATIVE

Isoo Shimizu; Yasuo Matsumura, both of Yokohama, and Yutaka Arai, Tokyo, all of Japan, assignors to Nippon Petrochemicals Company, Limited, Tokyo, Japan

Continuation of Ser. No. 283,480, Nov. 18, 1988, abandoned. This application Mar. 23, 1990, Ser. No. 499,191
Claims priority, application Japan, Mar. 20, 1987, 62-66466
Int. Cl.[5] C07C *69/76*
U.S. Cl. 560—101 **4 Claims**

1. A process for preparing α-(3-benzylpropionic acid derivative, which comprises the steps of: obtaining a reaction product comprising unreacted benzene, ethylbenzene, polyethylbenzene and heavier components by alkylating benzene with ethylene in the presence of ZSM-5 type synthetic zeolite catalyst, then recovering by distillation a fraction containing main components of 288° to 295° C. in boiling point, atmospheric pressure basis, from said reaction product, further dehydrogenating said fraction in the presence of a dehydrogenation catalyst, carbonylating the product with carbon monoxide and hydrogen or carbon monoxide and water or a lower alcohol in the presence of a transition metal complex carbonylation catalyst at a reaction temperature of 40° to 200° C., and recovering α-(3-benzylphenyl)propionic acid derivative represented by the following formula (I),



(I)

by means of distillation, extraction or combination thereof.

4,999,451

PROCESS FOR PREPARING DIHALOVINYLCYCLOPROPANECARBOXYLATES

Kiyoshi Kondo; Kiyohide Matsui; Akira Negishi, all of Kanagawa, and Yuriko Takahatakae, Tokyo, all of Japan, assignors to Sagami Chemical Research Center, Tokyo, Japan

Continuation of Ser. No. 507,998, Jun. 27, 1983, Pat. No. 4,833,266, which is a continuation of Ser. No. 160,540, Jun. 18, 1980, abandoned, which is a continuation of Ser. No. 606,807, Aug. 22, 1975, Pat. No. 4,681,953. This application Apr. 26, 1989, Ser. No. 343,318

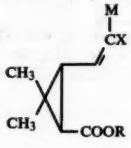
Claims priority, application Japan, Sep. 10, 1974, 49-103520; Sep. 10, 1974, 49-103521; Sep. 26, 1974, 49-109975; Sep. 26, 1974, 49-109975; Sep. 26, 1974, 49-109976; Nov. 30, 1974, 49-136631; Nov. 30, 1974, 49-136632; Dec. 2, 1974, 49-137026; Dec. 3, 1974, 49-137752; Jan. 16, 1975, 50-6429; Jan. 22, 1975, 50-8673; Jan. 31, 1975, 50-12389; Feb. 19, 1975, 50-19917; Feb. 19, 1975, 50-19918; Feb. 24, 1975, 50-21857; Mar. 11, 1975, 50-28606; Mar. 11, 1975, 50-28607; Jun. 4, 1975, 50-66592; Jun. 4, 1975, 50-66593

The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

Int. Cl.[5] C07C *69/74*

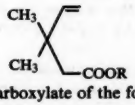
U.S. Cl. 560—124 6 Claims

1. A process for preparing a halovinylcyclopropanecarboxylate of the formula

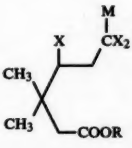


which comprises

(i) adding a carbon halide, MCX_3, to a γ-unsaturated carboxylate of the formula



to produce a γ-halocarboxylate of the formula



(ii) dehydrohalogenating the γ-halocarboxylate to remove therefrom two molecules of hydrogen halide so as to bring about ring closure between and α and γ carbons and form a double bond between the δ and ϵ carbons to produce said halovinylcyclopropanecarboxylate;

wherein

(a) R is a lower alkyl group;

(b) X is a halogen atom;

(c) M is a monovalent substituent which is halogen, hydrogen, lower alkyl, or lower haloalkyl; and

(d) MCX_3 is a polyhalogenated lower alkane.

4,999,452

PROCESS FOR PRODUCING ACRYLIC ESTER

Donald L. Bunning, South Charleston; William G. Etzkorn, Cross Lanes; William M. Haydon, South Charleston; Gordon G. Harkreader, Charleston; Jonathan J. Kurland, Charleston; Wai C. Liu, Charleston, and Ernesto Vera-Castaneda, Charleston, all of W. Va., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Filed May 15, 1989, Ser. No. 351,479

Int. Cl.[5] C07C *67/00*

U.S. Cl. 560—208 15 Claims

1. In a process for producing acrylic ester comprising the steps of:

(1) oxidizing propylene or acrolein in the presence of a catalyst to obtain a reaction gas effluent stream containing an acrylic acid fraction;

(2) condensing said reaction gas stream to obtain a condensed crude acrylic acid solution;

(3) refining said condensed crude acrylic acid solution; and

(4) reacting the refined acrylic acid solution obtained according to Step (3) above with an alcohol in the presence of a catalyst to produce acrylic ester and water;

the improvement which comprises eliminating or greatly minimizing said refining Step (3) by

(A) partially condensing said reaction gas stream of Step (1) above to obtain (i) a first crude liquid stream of an enriched acrylic acid solution containing about 10 to about 90% of said acrylic acid fraction and (ii) a second uncondensed reaction gas stream containing from about 90 to about 10% of said acrylic acid fraction; and

(B) without first having combined said obtained crude liquid stream of enriched acrylic acid solution with any additional crude liquid acrylic acid obtained by condensing said second uncondensed reaction gas stream defined above, and also either without having first refined said obtained crude liquid stream of enriched acrylic acid solution, or after essentially having removed only some aldehyde and/or water byproduct from said obtained crude liquid stream of enriched acrylic acid solution; employing said obtained crude liquid stream of enriched acrylic acid solution as the acrylic acid starting material reactant for the esterification process of Step (4) above.

4,999,453

PREPARATION OF OLEFINICALLY UNSATURATED CARBOXYLIC ESTERS HAVING A TERMINAL ESTER GROUP

Franz Merger, Frankenthal; Hans Horler, Darmstadt; Wolfgang Hoelderich, Frankenthal, and Tom Witzel, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 14, 1989, Ser. No. 337,867

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1988, 3813147

Int. Cl.[5] C07C *67/30*

U.S. Cl. 560—211 8 Claims

1. A process for the preparation of olefinically unsaturated carboxylic esters having a terminal ester group and of the formulae Ia and Ib

$$R^1—CH_2—CH=CH—(CH_2)_{r-1}—COOR^2 \quad \text{(Ia)}$$

$$R^1—CH=CH—(CH_2)_r—COOR^2 \quad \text{(Ib)}$$

where R^1 is hydrogen, alkyl, cycloalkyl, aryl, or aralkyl, R^2 is C–C_8-alkyl and r is from 1 to 20, which process comprises converting an α-substituted α,ω-(n-alkylenedicarboxylic ester) of the formula II

$$R^1—CH_2—\underset{\displaystyle COOR^3}{\underset{|}{CH}}—(CH_2)_r—COOR^2, \quad \text{(II)}$$

where R^1 and R_2 have the abovementioned meanings and R^3 is C_1–C_8-alkyl, over an acidic heterogenous catalyst at from 150° to 800° C. and under from 0.01 to 50 bar.

4,999,454

PROCESS FOR THE PREPARATION OF TRICHLOROMETHYL CARBINOLS

Rudolf Soós; József Nemes; Miklós Szelestei; István Schler; László Vidra, all of Budapest, and István Székely, Dunakeszi, all of Hungary, assignors to Chinoin Gyogyszer ES Vegyeszeti Termekek Gyara RT., Budapest, Hungary

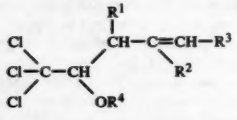
Continuation of Ser. No. 559,799, Dec. 9, 1983, abandoned. This application Oct. 3, 1985, Ser. No. 784,692

Claims priority, application Hungary, Dec. 13, 1982, 4005/82

Int. Cl.[5] C07C *67/08, 69/007, 69/145, 33/42*

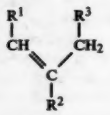
U.S. Cl. 560—213 **8 Claims**

1. A process for the preparation of a compound of the formula (I)



wherein

R^1, R^2 and R^3 each is hydrogen or alkyl containing 1 to 4 carbon atoms, or R^1 and R^2 together or R^1 and R^3 together form alkylene; and R^4 is hydrogen, C_1–C_4 alkanoyl, or aroyl, which comprises the step of reacting a compound of the formula (II)



with chloral in a 1 to 1 molar ratio in the presence of a catalyst selected from the group consisting of $FeCl_3 \times 6H_2O$, $FeSO_4 \times 2H_2O$, $Fe(NH_4)_2(SO_4)_2 \times 6H_2O$, anhydrous $FeCl_3$ and triethylamine in a 1 to 2 molar ratio, $Fe_3(PO_4)_2 \times 8H_2O$, $FeBr_3 \times 6H_2O$ and $(NH_4)_3\,Fe(C_2O_4)_3 \times 3H_2O$ to yield a reaction product;

and in the case where the desired compound is the compound of the formula (I) where R^4 is hydrogen, decomposing the reaction product with an acid to partition the reaction product into an organic layer containing the desired product and an aqueous layer containing the catalyst, and separating the organic layer from the aqueous layer; and in the case where the desired compound is the compound of the formula (I) where R^4 is C_1–C_4 alkanoyl or aroyl, acylating the reaction product with an acylating agent to yield the compound of the formula (I) where R^4 is C_1–C_4 alkanoyl or aroyl, and isolating the compound of the formula (I).

4,999,455

ACRYLIC DERIVATIVE OF UREA

Garrigue, Roger, and Jack Lalo, both of Toulouse, France, assignors to Norsolor S.A., Paris la Defense, France

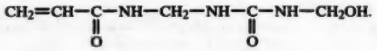
Filed May 1, 1989, Ser. No. 345,268

Claims priority, application France, Apr. 29, 1988, 88 05745

Int. Cl.[5] C07C *275/20*

U.S. Cl. 564—59 **6 Claims**

1. A monomethylolacrylamidomethyleneurea of the formula:



4,999,456

N-DIBENZOSUBERENYLACRYLAMIDE (N-5-(5H-DIBENZO[A,D]CYCLOHEPTENYL)ACRYLAMIDE)

Dodd W. Fong, Naperville, Ill., assignor to Nalco Chemical Company, Naperville, Ill.

Continuation-in-part of Ser. No. 498,657, Mar. 26, 1990. This application Sep. 4, 1990, Ser. No. 576,880

Int. Cl.[5] C07C *233/00;* **C08F** *20/70*

U.S. Cl. 564—207 **1 Claim**

1. N-dibenzosuberenylacrylamide (N-5-(5H-dibenzo[a,d]cycloheptenyl)acrylamide).

4,999,457

PROCESS FOR THE SYNTHESIS OF 3-CHLORO-4-HYDROXYACETANILIDE

Olan S. Fruchey, Corpus Christi, Tex., assignor to Hoechst Celanese Corporation, Somerville, N.J.

Continuation-in-part of Ser. No. 153,756, Feb. 8, 1988. This application Feb. 8, 1990, Ser. No. 478,294

Int. Cl.[5] C07C *233/25;* **C07B** *43/06*

U.S. Cl. 564—223 **5 Claims**

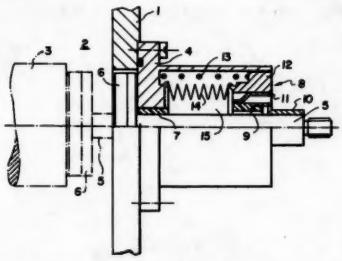
1. A process for the production of 3-chloro-4-hydroxyacetanilide in high yields which comprises reacting a mixture consisting essentially of N-acetyl-para-aminophenol with sulfuryl chloride as a slurry in a reaction medium of liquid sulfur dioxide at a temperature from 0°–50° C. under autogenous pressure.

4,999,458

ELECTRICAL CURRENT LEAD-IN DEVICE AT A VACUUM CHAMBER

Anton Kunz, Triesenberg, Liechtenstein, assignor to Balzers Aktiengesellschaft, Balzers, Liechtenstein

Filed Jan. 11, 1990, Ser. No. 463,372
Claims priority, application Switzerland, Jan. 26, 1989, 245/89
Int. Cl.[5] H01R *17/26*
U.S. Cl. 174—9 R 3 Claims



1. An electrical current lead-in device at a vacuum chamber operative to coat a workpiece which contacts a current conductor, in which a current conductor extends into the vacuum chamber and is designed as a piston rod that supports an annular piston at a distance from said vacuum chamber and insulated against the piston rod, which annular piston is guided in a cylinder flanged onto the wall of said vacuum chamber, which annular piston is subjected at its outer side to atmospheric pressure and limits by a part of its inner surface a sealed space communicating with said vacuum chamber and located within said cylinder and is subjected to a pressure force of a spring counteracting the atmospheric pressure, which spring features a spring force which at the vacuum prevailing in said sealed space is lower than the atmospheric pressure acting onto the outer side of the piston and by means of which the piston is displaced into a position in which the current conductor designed as a piston rod contacts said workpiece in a current conducting state, which contact in the pressurized state of said vacuum chamber is interrupted due to an opposite displacement of said piston due to the in this state higher pressure prevailing in said sealed space and said spring force.

4,999,459

SEALING ENCLOSURES AGAINST ELECTROMAGNETIC INTERFERENCE

Kevin Smith, Munster Hamlet, and Detlef Zimmermann, Nepean, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jul. 12, 1989, Ser. No. 378,804
Int. Cl.[5] H05K *9/00*
U.S. Cl. 174—35 GC 34 Claims

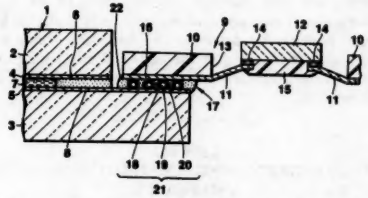
1. An enclosure having at least one opening and a closure therefor, and a sealing arrangement for sealing against electromagnetic radiation from a joint between the closure and the enclosure, said closure comprising a panel and a shield comprising a film of electrically conductive material extending over a face of said panel, said sealing arrangement comprising a conductive flexible strip overlying a peripheral region of said closure such that the strip will be sandwiched between the closure and the enclosure surrounding said opening when said closure is closed, said flexible strip comprising a margin of said film of electrically conductive material, an edge of said conductive flexible strip being attached to a surface of said closure at a position spaced inwardly from said peripheral region, said sealing arrangement further comprising magnet means for urging said flexible strip into contact with the enclosure to seal said opening.

4,999,460

CONDUCTIVE CONNECTING STRUCTURE

Kazuhiro Sugiyama, Kunitachi, and Yoshinori Atsumi, Oome, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Filed Nov. 6, 1989, Ser. No. 432,135
Claims priority, application Japan,
Int. Cl.[5] H01R *3/00*
U.S. Cl. 174—94 R 6 Claims



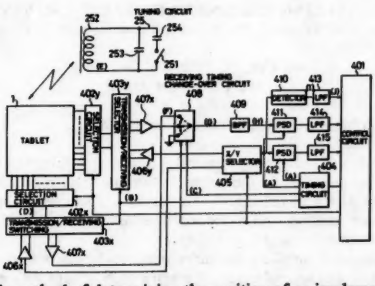
1. A conductive connecting structure, comprising:
a first connecting terminal;
a second connecting terminal arranged to oppose said first connecting terminal;
a plurality of fine connecting particles interposed between said first and said second connecting terminals, each of said fine connecting particles including a fine insulating particle having an electric conductive layer on an outer surface thereof, and an insulating layer comprising a material having a relatively low melting point and covering substantially the entire surface of said fine insulating particle; and
an insulating adhesive filled in a gap between said first and said second connecting terminals, wherein
only portions of said insulating layer covering the surface of said fine insulating particle of each said fine connecting particles which oppose said first and said second connecting terminals are broken, and said first and said second connecting terminals are electrically connected to each other through said fine connecting particles via the conductive layer as exposed from the broken portions of each of said insulating layer.

4,999,461

COORDINATES INPUT APPARATUS

Azuma Murakami; Teruyoshi Hagiwara; Yoichi Tuchida, and Hideki Johno, all of Saitama, Japan, assignors to Wacom Co., Ltd., Saitama, Japan

Division of Ser. No. 206,404, Jun. 14, 1988, Pat. No. 4,848,496.
This application May 19, 1989, Ser. No. 354,333
Claims priority, application Japan, Jun. 16, 1987, 62-148055
The portion of the term of this patent subsequent to Jul. 18, 2006, has been disclaimed.
Int. Cl.[5] G08C *21/00*
U.S. Cl. 178—19 48 Claims



1. A method of determining the position of an implement in

proximity to a tablet, the implement including a tuned circuit with a predetermined resonant frequency, the tablet including coils arranged in two coordinate directions, comprising the steps of:

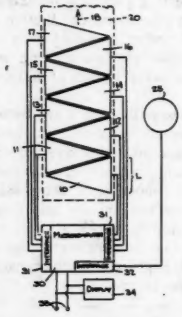
exciting at least some of the coils with AC energy having approximately the same frequency as the resonant freuqency, the tuned circuit interacting with the AC energy to change the AC current flowing in at least some of the coils as a function of the implement position relative to the tablet, and responding to the amplitude of AC current flowing in at least some of the coils to indicate the implement position by detecting the amplitude value of the current in a plurality of the coils and combining indications of the amplitude value of the current flowing in the plural coils.

4,999,462

POSITION DETERMINING AND DIGITIZING METHOD AND DEVICE

Alexander M. Purcell, Guilford, Conn., assignor to Summagraphics Corporation, Seymour, Conn.

Filed Oct. 6, 1989, Ser. No. 417,870
Int. Cl.[5] G08C *21/00*
U.S. Cl. 178—19 **15 Claims**



1. A tablet for a coordinate positioning device comprising a plurality of substantially identically shaped first coplanar electrodes and a plurality of second electrodes coplanar with said first electrodes and shaped substantially identically to said first electrodes, said first electrodes being sequentially arranged in a row extending in a first direction and intermeshed with and insulated from said second electrodes, said first and second electrodes having dimensions in said first direction that continually diminish in opposite directions perpendicular to said first direction, and means for separately coupling each of said electrodes independently to a device.

4,999,463

ARC STALLING ELIMINATING DEVICE AND SYSTEM

Simon Yin, Fremont, Calif., assignor to Square D Company, Palatine, Ill.

Filed Oct. 18, 1988, Ser. No. 259,242
Int. Cl.[5] H01H *33/66*
U.S. Cl. 200—144 B **3 Claims**

1. A high voltage interrupter, comprising:

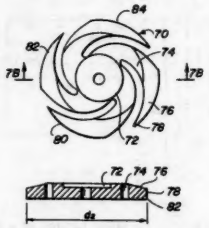
a sealed vessel;

a pair of confronting electrodes disposed within said vessel and mounted for movement between a first closed position in which said electrodes have contact faces which engage one another and a second open position in which said contact faces are spaced apart;

means for moving said confronting electrodes between said first and second positions when a high voltage AC current appears across said electrodes in order to interrupt that current, whereby said current generates an arc between said electrodes until said current goes to zero;

wherein each of said electrodes are fabricated from a common material and has a specific geometry defining a central depressed region, said contact face, a circumferential periphery sloped away from said contact face and a plurality of flanges, each of said flanges originating in said contact face at said depressed region and continuing to said sloped circumferential periphery;

said flanges being further defined by a plurality of slots equal in number to said plurality of flanges and separating said flanges from one another, said slots originating in said



contact face immediately adjacent said depressed region to sufficiently space said flanges from one another so that an arc emanating on one flange necessarily propagates to the periphery of that flange and does not propagate along said contact face to an adjacent flange;

each of said slots having a uniform width and being defined by an incrementally increasing radius of curvature;

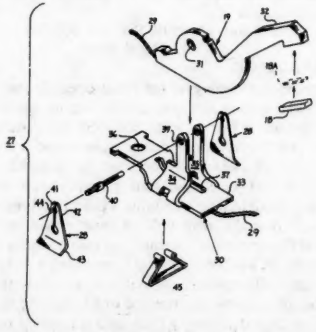
said electrodes being further configured such that said arc generated during separation of said electrode faces is caused to move rapidly to said circumferential periphery of said electrodes and around said circumferential periphery with substantially no stalling, whereby metal vapor from arcing is minimized.

4,999,464

MOLDED CASE CIRCUIT BREAKER CONTACT AND CONTACT ARM ARRANGEMENT

Joseph P. Bellino, West Simsbury; David Arnold, Chester; Dexter T. O'Brien, Simsbury, and Ira B. Goldman, Waterbury, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed Mar. 23, 1990, Ser. No. 498,777
Int. Cl.[5] H01H *1/02*
U.S. Cl. 200—267 **10 Claims**



1. A molded case circuit breaker contact and contact arm arrangement comprising:

an elongated movable copper contact arm having a silver-

impregnated contact attached to one end and a thru-hole arranged through said contact arm intermediate said one end and an opposite end;

a support comprising a pair of apertured upstanding support arms extending from a support base;

a pivot pin extending through said apertured support arms and said thru-hole electrically and mechanically attaching said contact arm to said support arms and providing rotation of said contact arm between closed and open positions; and

nickel metal arranged intermediate said copper contact arm and said silver-impregnated contact thereby preventing intermixing between said silver and said copper when said contact is attached to said contact arm.

4,999,465

LIGHT SWITCH PLATE COVER

Marvin G. Kuhlman, 446 Cambridge, Des Plaines, Ill. 60016; Gerald R. Sorensen, 845 Brook St., Elgin, Ill. 60120, and Raymond J. Gradecki, 264 Lincoln, Mundelein, Ill. 60060

Filed Aug. 31, 1990, Ser. No. 576,376

Int. Cl.[5] H01H *9/16*

U.S. Cl. 200—308 **16 Claims**

1. A switch plate cover for a wall switch having a switch actuator, said cover comprising:

a generally elongated panel, said panel folded substantially about a transverse fold line to form an outer member and an adjacent, inner member, said outer member including a graphic representation having an aperture through said outer member;

a slot disposed along said fold line;

a slide disposed between said outer and inner members, said slide including a tongue extending outwardly through said slot, said tongue including means for receiving said switch actuator and sliding between first and second positions in response to actuation of said switch between respective on and off positions; said slide further including first graphic indicia aligned with said aperture when said slide is in one of said first or second positions.

4,999,466

DRIP COFFEE MAKER FOR USE WITHIN A MICROWAVE OVEN

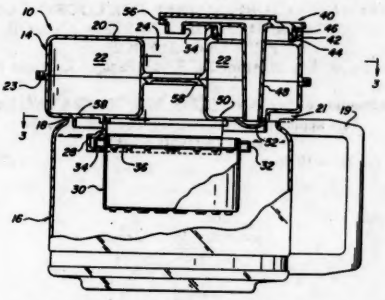
Gordon Wallgorski, Delphi, Ind., assignor to Farberware Inc., Bronx, N.Y.

Filed Feb. 13, 1989, Ser. No. 310,447

Int. Cl.[5] H05B *6/80*; A47J *31/02*

U.S. Cl. 219—10.55 E **21 Claims**

1. A microwave drip coffee brewing apparatus for use within a microwave oven, comprising: a reservoir defining a closed chamber for retaining a quantity of water for heating by microwave energy, a carafe for receiving a quantity of brewed coffee, pump tube means removably attached to the reservoir, the pump tube means having an inlet end and an outlet end, the inlet end extending into the reservoir to a position adjacent the bottom surface of the chamber, the attachment of the pump tube means to the reservoir sealing the chamber from ambient air pressure, a basket having a perforated bottom surface adapted to retain coffee grounds while permitting brewed coffee to pass therethrough, the basket supported below the outlet end of the pump tube means and above the opening into the carafe, whereby the microwave energy of the oven is directed onto the water retained in the reservoir, heating the water, the heating of the water in the closed, sealed chamber of



the reservoir means over time increasing the pressure within the reservoir, the pressure increase forcing the heated water through the inlet end of the pump tube means and discharged from the outlet end onto the coffee grounds within the basket, thereby brewing coffee upon contact with the grounds, and the brewed coffee dripping from the basket into the carafe position below the basket.

4,999,467

LOW-FREQUENCY ELECTROMAGNETIC INDUCTION HEATER

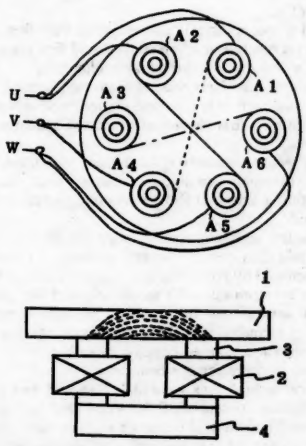
Atushi Iguchi, Kyoto, Japan, assignor to Nikko Corporation Ltd., Kyoto, Japan

Filed Jan. 23, 1990, Ser. No. 469,064

Claims priority, application Japan, Jan. 23, 1989, 1-14541; May 29, 1989, 1-137081; Aug. 8, 1989, 1-205137

Int. Cl.[5] H05B *6/12*

U.S. Cl. 219—10.493 **8 Claims**



1. A low-frequency electromagnetic induction heater comprising at least six induction coils electrically connected in a three-phase double delta connection, wherein each coil has a circular configuration, said coils being arranged in a circular

symmetrical configuration, and wherein said coils form three sets of coils such that each set of coils receives electrical power of a different phase from a three-phase low-frequency electrical power source, and wherein the coils are enclosed in a resinous mold.

4,999,468

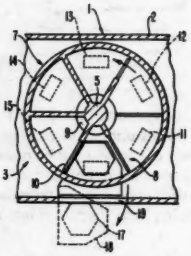
OVEN STRUCTURE, MAINLY FOR COOKING OF NATURAL AND/OR DEEP-FROZEN AND/OR PRE-COOKED FOOD

Paolo Fadel, Via Manzoni 30, 31042 Fagare'-S. Biagio (TV), Italy

Continuation of Ser. No. 175,248, Mar. 30, 1988, abandoned. This application Jun. 6, 1989, Ser. No. 363,424

Int. Cl.[5] H05B *6/80*

U.S. Cl. 219—10.55 A **8 Claims**



1. Combination microwave/infrared oven structure with rotary conveyor comprising;

a container having a bottom,

a downwardly open cylindrical box-like structure downwardly fixed to said bottom of said container,

an upper closure wall upwardly closing said box-like structure,

a lateral surface defined internally on said box-like structure,

a shaft protruding axially within said box-like structure from said upper closure wall towards said bottom,

a plurality of angularly spaced radial sectors each connected to said shaft, said lateral surface, and said upper closure wall, said plurality of sectors consisting of;

a first sector,

a second sector angularly spaced from said first sector to define therebetween a first station, said first station constituting a first microwave cooking chamber,

a thifd sector angularly spaced from said second sector to define therebetween a second station, said second station constituting a first short-wave infrared radiation cooking chamber,

a fourth sector angularly spaced from said third sector to define therebetween a third station, said third station constituting a second short-wave infrared cooking chamber, and

a fifth sector angularly spaced from said fourth sector and from said first sector, thereby defining a fourth station between said fourth sector and said fifth sector, and a fifth station between said fifth sector and said first sector, said fourth station constituting a first medium-wave infrared cooking chamber, said fifth station constituting a second medium-wave infrared cooking chamber,

said over structure further comprising;

rotary conveyor means located within said box-like structure coaxial to said shaft between said bottom of said container and said plurality of sectors, said rotary conveyor means having a plurality of radial elements, said radial elements being adapted for moving plates through said first station, said second station, said third station, said fourth station and said fifth station, inlet means for permitting plates containing uncooked food to be operatively engaged by said conveyor means, outlet means for permitting plates of cooked food to be removed from said conveyor means,

at least one electronic circuit,

at least one logic unit, and

heating means constituted by;

at least one first microwave heating source and at least one second microwave heating source located at said first station,

at least one first short-wave infrared radiation heating source located at said second station,

at least one second short-wave infrared radiation heating source located at said third station,

at least one first medium-wave infrared radiation heating source located at said fourth station, and at least one second medium-wave infrared radiation heating source located at said fifth station,

said electronic circuit and said logic unit being adapted for controlling said conveyor means and intervention times and wavelengths of said first microwave heating source, said second microwave heating source, said first short-wave infrared radiation heating source, said second short-wave infrared radiation heating source, said first medium-wave infrared radiation heating source and said second medium-wave infrared radiation heating source.

4,999,469

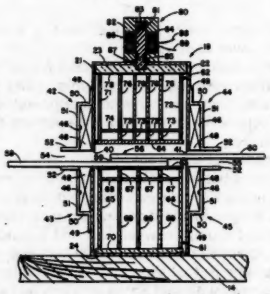
APPARATUS FOR MICROWAVE HEATING TEST COUPONS

Kenneth W. Dudley, Sadbury; Richard H. Edgar, Chelmsford, and E. Eugene Eves, II, Westford, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Apr. 2, 1990, Ser. No. 503,025

Int. Cl.[5] H05B *6/80*

U.S. Cl. 219—10.55 A **12 Claims**



1. A test bonding apparatus comprising:

a waveguide having electrically conductive wall means for providing said waveguide with an input portion, a terminating end portion and an intermediate coupon bonding chamber portion having an interior disposed in communication with said input portion and said terminating end portion of said waveguide, and for transmitting microwave energy from said input portion through said interior of said coupon bonding chamber portion into said terminating end portion;

aperture means extended through said electrically conductive wall means in said coupon bonding chamber portion and into communication with said interior thereof for providing access to said interior of said coupon bonding chamber portion from externally of said waveguide, and for permitting insertion into said interior and removal therefrom of a coupon test sandwich assembly; and

said coupon bonding chamber portion including clamping means disposed within said coupon bonding chamber portion for holding said coupon test sandwich assembly

while being heated by said microwave energy transmitted through said coupon bonding chamber portion.

4,999,470

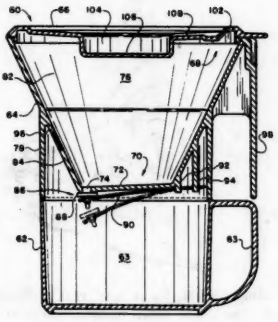
MICROWAVABLE COFFEE MAKER

Donald C. Fuchs, Jr., Mentor, Ohio, assignor to Mr. Coffee, Inc., Bedford Heights, Ohio

Continuation-in-part of Ser. No. 464,335, Jan. 12, 1990. This application Apr. 3, 1990, Ser. No. 503,730

Int. Cl.[5] 219 *10.55 F; 99 306, DIG. 14*

U.S. Cl. 219—10.55 E **14 Claims**



1. A device for brewing coffee with microwave energy comprising:

a receptacle for holding brewed beverage having an open upper end,

a generally funnel-shaped reservoir of molded plastic construction having an open upper end, a closed lower end and an aperture near said closed lower end, said reservoir dimensioned to receive a filter of specific size and shape therein and to simultaneously hold a predetermined amount of coffee particulate and water therein,

a removable cover for closing said opened upper end of said reservoir, support means on said reservoir operable to rest said reservoir on the upper edge of said receptacle with said aperture in registry with said open end;

means molded within said reservoir at a predetermined location to create a localized hot spot within said reservoir when exposed to microwave energy; and,

valve means operable to control flow of liquid from said reservoir through said aperture, said valve means movable from a closed position wherein flow through said aperture is obstructed and an open position wherein flow through said aperture is allowed when a predetermined condition exists in said reservoir.

4,999,471

METHOD FOR HEAT PREPACKAGED FOOD PRODUCTS USING MICROWAVES IN A HEATED SUPERATMOSPHERIC CHAMBER

Roberto Guarneri, Parma, and Claudio Ferrari, Reggio Emilia, both of Italy, assignors to Barilla G.E.R. F.LLI - Societa per Azioni, Parma, Italy

Filed Jun. 5, 1989, Ser. No. 361,476

Claims priority, application Italy, Jun. 3, 1988, 20853 A/88

Int. Cl.[5] H05B *6/64*

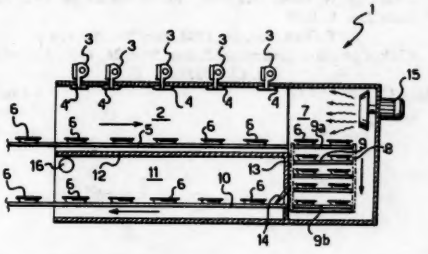
U.S. Cl. 219—10.55 M **6 Claims**

1. A method of heat stabilizing food products pre-packaged in containers which are at least partly transparent to microwaves, while at the same time sanitizing said containers, characterized in that it comprises the steps of

heating, as by the application of microwaves, said pre-packaged food products to a predetermined heating temperature in a processing zone where a hot air atmosphere is maintained at a superatmospheric pressure, said air being thermostat-regulated at a temperature substantially equal to the predetermined heating temperature,

keeping the food products, for a predetermined time period and under a substantially adiabatic condition, at the attained heating temperature in a second processing zone where a hot air atmosphere is maintained at a superatmospheric pressure, and

cooling said food products at a cooling temperature in a cooling zone at a superatmospheric pressure.



4,999,472

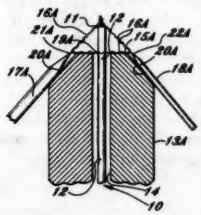
ELECTRIC ARC SYSTEM FOR ABLATING A SURFACE COATING

James E. Neinast, 5200 Carmel Park Dr., Charlotte, N.C. 28226, and Mark E. Neinast, 1915 Laurel La., Gastonia, N.C. 28054

Filed Mar. 12, 1990, Ser. No. 491,974

Int. Cl.[5] B23K *9/00*

U.S. Cl. 219—56.22 **4 Claims**



4. A method of cleanly ablating a portion of a surface coating along a selected cut-off line with an electrical arc system having two electrodes and means for generating an ablating arc between the electrodes, said method comprising:

(a) defining the selected cut-off line with one wall of an insulative block;

(b) arranging the electrodes obliquely to the selected cut-off line;

(c) electrically insulating the electrodes from each other beyond the selected cut-off line;

(d) positioning the portion of the coating to be ablated across the selected cut-off line and between the electrodes; and

(e) generating an ablating arc between the electrodes, whereby the surface coating is ablated cleanly along the selected cut-off line.

4,999,473

AUTOMATIC WIRE THREADING METHOD

Gotaro Gamo, Hachioji, and Tamotsu Ishibashi, Taito, both of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

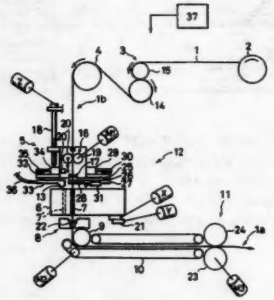
PCT No. PCT/JP88/01184, § 371 Date Sep. 19, 1989, § 102(e) Date Sep. 19, 1989, PCT Pub. No. WO89/04739, PCT Pub. Date Jun. 1, 1989

PCT Filed Nov. 24, 1988, Ser. No. 397,419

Claims priority, application Japan, Nov. 26, 1987, 62-296205

Int. Cl.[5] B23H *7/10*

U.S. Cl. 219—69.12 8 Claims



1. An automatic wire threading method, consisting of the steps of:

(a) cutting a wire, extending continuously from a wire supply means, through a first wire passage portion in a workpiece and to a delivery means, in the vicinity of a wire supporting portion provided on a wire supply side of a wire transportation system to create a leading end of the wire left on the supply side of the wire transportation system;

(b) sending out that portion of said wire which is left on a wire delivery side of said wire transportation system;

(c) aligning a second wire passage portion formed in the workpiece with said wire supporting portion at a position directly under said wire supporting portion;

(d) moving said wire supporting portion, along with the supply-side portion of said wire, toward said workpiece so that a leading end of the supply-side portion of said wire is mechanically fed into said second wire passage portion;

(e) moving said wire supporting portion away from said workpiece while supplying wire so as to keep the leading end of the supply-side portion of said wire in said second wire passage portion; and

(f) transporting the supply-side portion of said wire to the wire delivery side of said wire transportation system, thereby completing wire threading.

4,999,474

GAS MIXTURE AND WELDING METHOD

Jean-Pierre Schultz, Meulan; Jean Soler, Bessancourt, and Daniel Nicoud, Metz, all of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et L'Exploitation des Procedes Georges Claude, Paris, France

Filed Mar. 27, 1990, Ser. No. 499,882

Claims priority, application France, Mar. 30, 1989, 89 04192

Int. Cl.[5] B23K *9/173*

U.S. Cl. 219—74 8 Claims

5. An improved electrical welding method of the type employing rods and gas mixtures, wherein the improvement comprises employing a gas mixture comprising 35 to 55% argon, 5 to 20% helium, and 40 to 55% CO_2.

4,999,475

DETECTING SYSTEM OF ELECTRODE TIPS FOR A SPOT WELDER

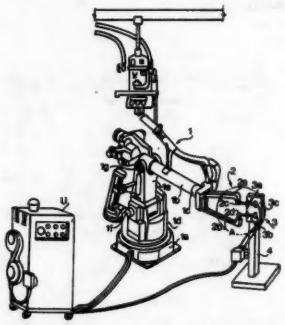
Katsumi Yasuge, Ashikaga, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 22, 1990, Ser. No. 497,503

Claims priority, application Japan, Apr. 7, 1989, 1-40531[U]

Int. Cl.[5] B23K *11/25*

U.S. Cl. 219—86.41 2 Claims



1. A detecting system for a spot welder having a pair of electrode tips attached to a pair of arms respectively, comprising:

a limit detecting device having a pair of axially slidable detecting rods spaced at a predetermined distance corresponding to the distance between the electrode tips, and a pair of switches each of which is operated by axial movement of the corresponding detecting rod;

means for moving the electrode tips to the detecting rods so as to axially move the detecting rods to operate the switches respectively;

means for determining whether each switch is operated or not;

indicator means responsive to non-operation of the switch for indicating working limit of the electrode tip.

4,999,476

MACHINE FOR PRESSURE WELDING WORKPIECES HEATED WITH ARC MOVING IN MAGNETIC FIELD

Sergei I. Kuchuk-Yatsenko; Valery G. Krivenko; Petr V. Kuznetsov; Vladimir J. Bogatyrev; Sergei I. Golovchenko, and Vadim J. Ignatenko, all of Kiev, U.S.S.R., assignors to Institut Elektrosvarki Imeni E. O. Patona Akademii Nauk USSR, Kiev, U.S.S.R.

PCT No. PCT/SU89/00162, § 371 Date Feb. 20, 1990, § 102(e) Date Feb. 20, 1990, PCT Pub. No. WO89/12524, PCT Pub. Date Dec. 28, 1989

PCT Filed Jun. 15, 1989, Ser. No. 459,743

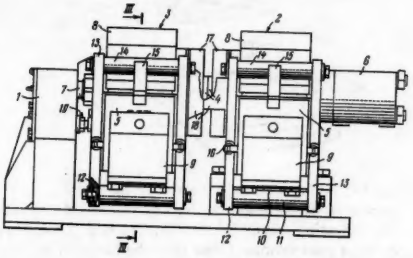
Claims priority, application U.S.S.R., Jun. 20, 1988, 4473982

Int. Cl.[5] B23K *11/04*

U.S. Cl. 219—97 3 Claims

1. In a machine for pressure welding workpieces heated with an arc moving in a magnetic field, a device comprising a first and a second clamping means holding fast the workpieces and each having a holding-down plate, which is hinged to a base at one side and fitted with a means for being displaced relative to the base, and a clamping hydraulic cylinder having a body mounted on the base and a piston rod hinged to tierods, holding-down rollers attached to the tierods, which interact with the holding-down plate in clamping the workpieces, the holding-down rollers being located on a side of the holding-down plate opposite to the side hinged to the base; two upsetting hydraulic cylinders attached to the base of the first clamping means which is mounted immovably, the second clamping means being mounted with its base on rods attached with their

first ends to the upsetting hydraulic cylinders so that the second clamping means can reciprocate towards and away from the first clamping means; and two means of setting a gap between end faces of the workpieces, which are movably linked to the upsetting hydraulic cylinders, said device further comprising a bedframe at one end of which is located the base of the first clamping means and at an opposite end of which are located second ends of the rods, two fasteners each in the form of an inverted L-shaped lever having two ends hinged to the base of either the first or the second clamping means at the side opposite to the side hinged to the base so as to interact with the



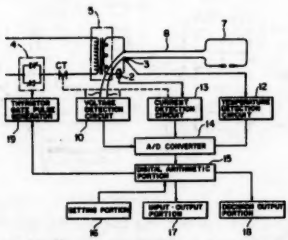
holding down rollers with one of its ends and with the holding down plate with the other end, whereby each means of displacing the holding-down plate relative to the base is provided in the form of a hydraulic cylinder having a body hinged to the base and a piston rod hinged to the holding-down plate at the side of the hinged joint thereof with the base and each means of setting a gap between the end faces of the workpieces is provided in the form of a plunger fitted to the bedframe at the side where the other ends of the rods are located, and an adjustable stop fitted to the base of the second clamping means in alignment with the plunger.

4,999,477

RESISTANCE MEASURING MECHANISM IN A RESISTANCE WELDING MACHINE

Teruzo Yamaguchi, and Tatsuo Morita, both of Tokyo, Japan, assignors to Obara Corporation, Tokyo, Japan

Filed Jul. 27, 1990, Ser. No. 558,802
Int. Cl.[5] B23K *11/25*
U.S. Cl. 219—110 **4 Claims**



1. A resistance measuring mechanism in a resistance welding machine comprising:

means for detecting the temperature of an exit through which the cold water for cooling cables and the like flows and the temperature of parts of cables;

means for detecting voltage at a secondary or a primary winding of a welding transformer; and

means for detecting welding current at the secondary or the primary winding of the welding transformer;

an analog to digital converter for converting analog data of the detected voltage, temperature, welding current to digital data thereof;

setting means for storing deterioration data of the cable and resistance value, voltage and welding current at a reference temperature;

a digital arithmetic operation means for receiving digital data of detected voltage, temperature, welding current from the analog to digital converter and deterioration data of the cable and resistance value, voltage and welding current at a reference temperature from the setting means;

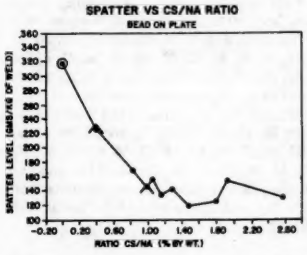
characterized in that the digital arithmetic operation means calculates the resistance value by correcting the resultant analog data of the detected temperature, voltage, welding current at the detecting temperature for voltage, welding current at the reference temperature and decides deterioration of the cable when the calculated resistance value exceeds a predetermined value.

4,999,478

METAL CORED ELECTRODE

Roger A. Bushey, Littlestown, and Stanley E. Ferree, Hanover, both of Pa., assignors to Alloy Rods Global, Inc., Hanover, Pa.

Filed Oct. 23, 1989, Ser. No. 425,725
Int. Cl.[5] B23K *35/22*
U.S. Cl. 219—137 WM **17 Claims**



1. A metal cored electrode for CO_2 gas shielded welding having core ingredients in a ferrous metal tube:

the metal tube having a seam; and

the core ingredients including (by weight of the electrode):

(a) from 0.01% to 0.5% cesium;

(b) at least one other alkali metal selected from the group consisting of lithium, sodium, potassium and rubidium in a weight ratio of from about 0.1 to about 3.0 cesium/other alkali metal(s);

(c) from 0.3% to 10% of at least one metallic alloying element selected from the group consisting of

from 0.2% to 2% silicon,

from 0.1% to 3% manganese,

up to 0.5% titanium,

up to 0.5% columbium,

up to 0.5% aluminum,

up to 3% chromium,

up to 3% nickel, and

up to 3% cobalt;

(d) up to 0.01% boron; and (e) the balance iron and incidental impurities.

4,999,479

ELECTRODE WIRE

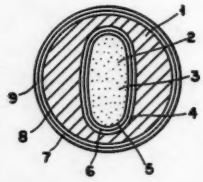
Boris E. Paton, ulitsa Kotsjubinskogo, 9, kv. 21; Nikolai M. Voropai, ulitsa Saljutnaya, 29a, kv. 25, both of Kiev; Boris A. Nikiforov, ulitsa Kuibysheva, 25, kv. 10, Magnitogorsk; Georgy A. Schegolev, ulitsa Oktyabrskaya, 11, kv. 20, Magnitogorsk; Gennady P. Logiko, ulitsa Zhdanova, 22, kv. 15, Magnitogorsk, and Vasily G. Mischanin, ulitsa Lermontova, 18, kv. 15, Zaporozhie, all of U.S.S.R.

PCT No. PCT/SU88/00148, § 371 Date Mar. 23, 1990, § 102(e) Date Mar. 23, 1990, PCT Pub. No. WO90/00953, PCT Pub. Date Feb. 8, 1990

PCT Filed Jul. 26, 1988, Ser. No. 490,604

Int. Cl.[5] B23K *35/10*

U.S. Cl. 219—145.22 9 Claims



1. An electrode wire comprising an alloyed metal body (1; 10; 21; 32; 43; 59) provided with at least one longitudinal cavity (3; 12; 23; 34; 45; 61) filled with a charge (2; 11; 22; 33; 44; 60) comprising at least one constituent selected from the group consisting of slag-forming and alloying constituents, characterized in that on the surface of the cavity (3; 12; 23; 34; 45; 61) and the wire there is disposed a coat (4 and 7; 13 and 18; 24 and 28; 35 and 39; 46 and 52; 62 and 66) made up of at least two layers (5, 6; 8, 9; 14, 15, 16, 17; 19, 20; 25, 26, 27; 29, 30, 31; 36, 37, 38; 40, 41, 42; 47, 48, 49, 50, 51; 53, 54, 55, 56, 57, 58; 63, 64, 65; 68, 69, 70) each of which consists on one constituent selected from the group consisting of alloying and slag-forming constituents, from 10 to 99 percent of the mass of the constituents in the layers (5, 6; 8, 9; 14, 15, 16, 17; 19, 20; 25, 26, 27; 29, 30, 31; 36, 37, 38; 40, 41, 42; 47, 48, 49, 50, 51; 53, 54, 55, 56, 57, 58; 63, 64, 65; 68, 69, 70) of the coat (4, 7; 13, 18; 24, 28; 35, 39; 46, 52; 62, 66) being disposed on the surface of the cavity (3; 12; 23; 34; 45; 61), and the total area of the layers (5, 6; 8, 9; 14, 15, 16, 17; 19, 20; 25, 26, 27; 29, 30, 31; 36, 37, 38; 40, 41, 42; 47, 48, 49, 50, 51; 53, 54, 55, 56, 57, 58; 63, 64, 65; 68, 69, 70) of the coat (4, 7; 13, 18; 24, 28; 35, 39; 46, 52; 62, 66) in cross section of the wire, consisting of the identical constituents, being equal to from 0.001 to 0.1 part of the area of the metal body (1; 10; 21; 32; 43; 59).

4,999,480

HOLDER WITH AUTOMATIC TIMED SHUT-OFF FOR LARGE TIPPED ELECTRIC SOLDERING IRONS

David R. Smith, Jefferson County, Colo., assignor to Soldering Tool Reconditioning, Inc., Denver, Colo.

Filed Mar. 3, 1989, Ser. No. 318,735

Int. Cl.[5] H05B *1/02*; B23K *3/08*

U.S. Cl. 219—242 17 Claims

1. A soldering iron holder for holding an electrically heated soldering iron having a barrel, a handle connected to one end of the barrel, and an enlarged soldering tip connected to an other end of the barrel, said holder comprising

a substantially rectangular box-shaped housing;

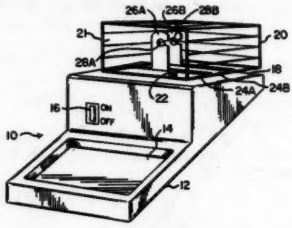
hollow shield means mounted on said housing for shielding said iron, said shield means having a large opening in one surface, said large opening being sufficient to allow insertion of the barrel and enlarged tip;

a bracket mounted substantially vertical inside said hollow shield and attached to said shield;

a slot formed horizontally in a side of said bracket, said slot having a dimension sufficient to allow the barrel of the soldering iron to be inserted therein whereby said slot will receive and hole the barrel of the soldering iron and prevent the tip from contacting said shield thereby preventing said shield from sinking heat from the tip;

power supply means for supplying electrical power to said soldering iron to thereby heat the same;

means for detecting the presence of said iron in said bracket; and



resettable timing means activated by the detection of the placement of the soldering iron barrel in said bracket by said detecting means for deactivating said power supply means a predetermined time after the barrel of the iron is placed in said slot of said bracket, said timing means being reset in response to the detection of the removal of the soldering iron from said bracket by said detecting means.

4,999,481

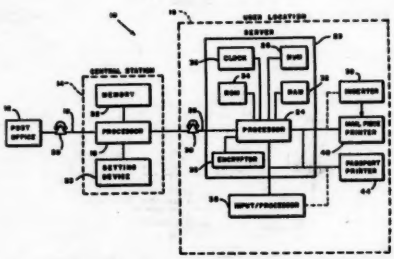
METHOD AND APPARATUS FOR SEQUENTIALLY NUMBERING MAIL PIECES

Patricia B. Baer, Pelham, N.Y.; Kevin D. Hunter, Stratford, Conn.; William G. Hart, Stamford, Conn.; Barry H. Axelrod, Newton, Conn., and Ronald P. Sansone, Weston, Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Continuation-in-part of Ser. No. 813,445, Dec. 26, 1985, Pat. No. 4,962,454, which is a division of Ser. No. 940,103, Dec. 10, 1986, Pat. No. 4,821,195. This application Dec. 19, 1988, Ser. No. 285,981

Int. Cl.[5] G06F *15/21*, *15/30*

U.S. Cl. 235—375 19 Claims



1. An apparatus for processing and providing authentication information relative to the payment of postage for a batch of mail, said apparatus comprising:

means for processing a plurality of mail pieces for mailing including a register having postage value store therein;

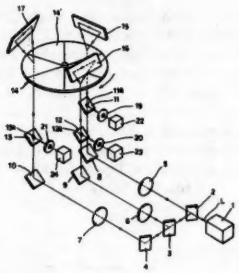
means for reducing the postage value in said register for the postage required to mail said plurality of mail pieces and means for determining the amount of postage required to mail said plurality of mail;

means for printing a truncated number on each of said mail pieces that is a combination of portions of at least two numbers associated with the processing of said mail pieces whereby payment of postage can be determined by verifying the distinctness of each of said truncated numbers.

4,999,482
OPTICAL SCANNING SYSTEM FOR A BAR CODE READER

Keun Y. Yang, Seoul, Rep. of Korea, assignor to Goldstar Co, Ltd., Seoul, Rep. of Korea

Filed May 23, 1989, Ser. No. 355,346
Claims priority, application Rep. of Korea, May 24, 1988, 6094/1988
Int. Cl.[5] G06K *7/10*
U.S. Cl. 235—457 **3 Claims**



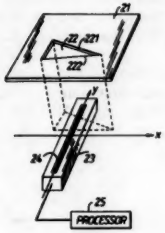
1. An optical scanning system for a bar code reader utilizing a hologram scanner, comprising:
- a laser beam generator for producing a laser beam;
- beam splitters for dividing said laser beam into parallel paths;
- focusing lenses and first reflectors for focusing the divided laser beams;
- second reflectors provided with first holes, said first holes passing the focused beams therethrough;
- a hologram disk rotating at a high speed for deflecting the beams passing through said first holes; and
- third reflectors disposed respectively at top of said hologram disk for forming the deflected beams into a star-shaped pattern to be passed through a window formed in a housing, said star-shaped beams are reflected from a surface of an article having a bar code;
- said reflected laser beams being reflected again by said third reflectors respectively and directed to said hologram disk and focused;
- said reflected beams from said hologram disk being reflected again by said second reflectors and passed through second holes disposed at focusing positions of said hologram disk so that said beams from said second pin holes are detected by photo-detectors.

4,999,483
SENSOR FOR DETECTING TWO DIMENSIONAL ANGLE OF INCIDENCE OF THE SUN

Tsuguhiko Okamoto, Kanagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 12, 1989, Ser. No. 448,848
Claims priority, application Japan, Mar. 9, 1989, 1-0154961
Int. Cl.[5] G01J *1/20*
U.S. Cl. 250—203.1 **19 Claims**

1. A sun sensor for detecting first and second components of an angle of incidence of sunlight, comprising:
- transmitting means having an opening with first and second linear portions for transmitting sunlight, a line parallel to the first linear portion crossing a line parallel to the second linear portion at an angle different from 90 degrees;
- detecting means, having plural detecting elements and disposed along a line, for generating output signals corresponding to sunlight passing through the first and second linear portions; and
- processing means for determining and producing data signals corresponding to first and second components of the

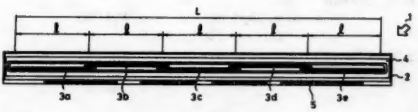


angle of incidence of the sunlight in response to the output signals from the detecting means.

4,999,484
MULTI-CHIP TYPE IMAGE SENSOR

Yutaka Kaneko, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 22, 1989, Ser. No. 410,848
Claims priority, application Japan, Sep. 26, 1988, 63-240353
Int. Cl.[5] H01J *40/14*
U.S. Cl. 250—208.1 **4 Claims**



1. A multi-chip type image sensor comprising:
- a base;
- a plurality of sensor chips arranged on said base so as to be staggered so that adjacent sensor chips among said sensor chips partially overlap with each other in the direction perpendicular to a direction in which said sensor chips are arranged, said sensor chips being fastened to said base by an adhesive for use in die bonding, each of said sensor chips having a plurality of light receiving elements arranged into a line at a predetermined pixel pitch Pd, each of said sensor chip comprising silicon; and
- terminal pins supported on said base and electrically coupled to said sensor chips,

the following formula being satisfied:

$$Pc = Pd \times [1 + (Tc - Ta)(\alpha_B - \alpha_{Si})]$$

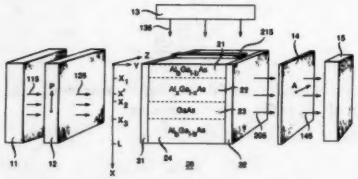
where Tc [°C.] is a curing temperature of said adhesive, Ta [°C.] is an enviroment temperature at which said image sensor is to be used, α_{Si} is a thermal expansion coefficient of each of said sensor chips comprising silicon, α_B is a thermal expansion coefficient of said base, and Pc is a pixel pitch at which said light receiving elements are arranged in each of said sensor chips before said adhesive is cured by die bonding.

4,999,485

NONLINERAR OPTICAL DEVICE STRUCTURE WITH COMPOUND SEMICONDUCTOR HAVING GRADED CHEMICAL COMPOSITION

Federico Capasso, Westfield, and Stephen E. Ralph, North Plainfield, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation-in-part of Ser. No. 423,073, Oct. 18, 1989, abandoned. This application Jun. 4, 1990, Ser. No. 533,999
Int. Cl.[5] H01J *31/50;* G02F *1/01;* H01L *27/12*
U.S. Cl. 250—213 A 12 Claims



1. An optical control system comprising

(a) a compound semiconductor device structure having a semiconductor layer that has an effectively continuously graded bandgap such that the energy band diagram for the layer has an effectively continuously graded conduction band edge and an effectively continuously graded valence edge which propels electrons and holes, respectively, in the same direction but with different average speeds;

(b) a source of a second light beam; and

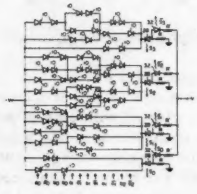
(c) a source of a first light beam incident upon the structure, whereby when the second light beam is directed upon the structure an optical property of the structure with respect to the first beam is modified.

4,999,486

OPTOELECTRIC LOGIC ARRAY

R. Aaron Falk, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Sep. 29, 1989, Ser. No. 414,004
Int. Cl.[5] H01J *31/50*
U.S. Cl. 250—213 A 24 Claims



1. An apparatus, comprising:

a semiconductor substrate;

element defining means for defining a plurality of photoconductive elements in said semiconductive substrate;

connecting means for connecting said photoconductive elements to form combinational logic gates;

light directing means positioned above said semiconductor substrate for directing light representing logic parameters to photoconductive elements of said logic gates;

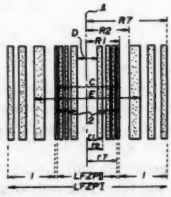
wherein said combinational logic gates have complementary inputs and complementary outputs such that combinational logic can be carried out using only AND and OR gates.

4,999,487

ALIGNMENT OF MASK AND SEMICONDUCTOR WAFER USING LINEAR FRESNEL ZONE PLATE

Shigeru Maruyama, Kawasaki; Shunsuke Fueki; Hironobu Kitajima, both of Yokohama, and Takashi Kiuchi, Tsukuba, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Division of Ser. No. 471,008, Jan. 25, 1990, Pat. No. 4,948,983, which is a continuation of Ser. No. 349,077, May 9, 1989, abandoned. This application May 21, 1990, Ser. No. 525,841
Claims priority, application Japan, May 13, 1988, 63-114767
Int. Cl.[5] H01J *3/14*
U.S. Cl. 250—216 6 Claims



1. A dual focus Fresnel zone plate for focusing a radiation beam incident thereto, comprising:

first linear Fresnel zone part having a first focal length and comprising a central zone and a plurality of parallel and alternating opaque and transparent bands disposed symmetrically about a central axis passing through the central zone; and

a second linear Fresnel zone part having a second focal length substantially smaller than the first focal length, said second linear Fresnel zone part being formed in said first linear Fresnel zone part and comprising a plurality of parallel and alternating opaque and transparent bands disposed symmetrically with respect to a symmetrical.

4,999,488

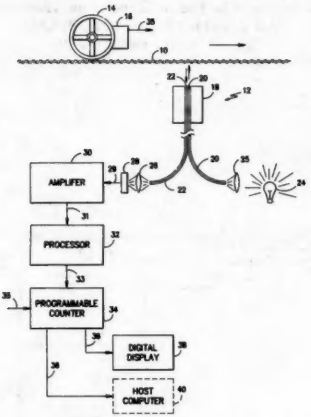
METHOD TO CONTINUOUSLY COUNT THE COURSES OR PICKS OF A MOVING FABRIC

John A. Sollars, LaGrange, Ga., assignor to Milliken Research Corporation, Spartanburg, S.C.

Filed Jan. 29, 1990, Ser. No. 471,642
Int. Cl.[5] G01V *9/04*
U.S. Cl. 250—222.2 2 Claims

1. A method to continuously count the courses or picks of a moving fabric comprising the steps of: supplying a running length of knit or woven fabric, measuring the rate of travel of the fabric and generating a first signal, placing a bundle of fiber optic strands adjacent one side of the fabric, supplying light from a light source through a portion of the fiber optic strands, reflecting a portion of the supplied light back from the fabric through another portion of the fiber optic strands to an ampli-

fier to produce a second signal, supplying the signal from the amplifier and the first signal to a programmable counter to



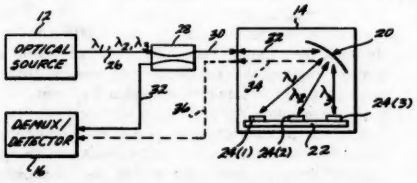
produce a signal equivalent to the course or pick count of the fabric and supplying the produced signal to a point of use.

4,999,489

OPTICAL SENSOR USING CONCAVE DIFFRACTION GRATING

Raymond W. Huggins, Mercer Island, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Mar. 17, 1989, Ser. No. 325,249
Int. Cl.[5] G01J 3/50
U.S. Cl. 250—226 **14 Claims**



1. A sensor for use in an optical sensing system for determining a value of a measurand, the sensing system including means for producing an optical composite input signal that includes a plurality of component signals, each component signal comprising light in a wavelength range different from the wavelength ranges of the other component signals, the sensor comprising:

encoding means having a plurality of tracks, each track including means responsive to the value of the measured for modulating the intensity of light incident thereon to produce a corresponding modulated signal; and

a concave diffraction grating for demultiplexing the composite input signal to produce separate component signals that are directed to and incident upon the respective tracks such that the tracks produce respective modulated signals, and means for multiplexing the modulated signals to produce a return signal.

4,999,490

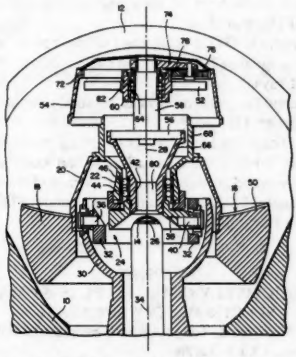
Patent Not Issued For This Number

4,999,491

OPTICAL SEEKER WITH ROSETTE SCANNING

Gerd Semler, Frickingen-Altheim, and Gerd Wilhelm, Uhldingen-Mühlofen, both of Fed. Rep. of Germany, assignors to Bodenseewerk Gerätetchnik GmbH, Bodensee, Fed. Rep. of Germany

Filed Jul. 9, 1987, Ser. No. 81,814
Claims priority, application Fed. Rep. of Germany, Jul. 11, 1986, 3623343
Int. Cl.[5] G01V 1/20; G02B 27/17
U.S. Cl. 250—236 **1 Claim**



1. Optical seeker with rosette scanning, adapted to scan a field of view along a rosette type path, comprising

(a) a rotor (16) having an outer rotor ring (18), a bell shaped intermediate portion (20) communicating therewith and extending in the direction of the field of view, and a hub portion (22) held coaxially in the intermediate portion (20),

(b) a gimbal mounting (24) for the rotor (16), comprising an outer mounting body (30) stationary with respect to the housing, in which body a first gimbal (32) is pivotably mounted about a first gimbal axis (36) extending perpendicularly to a first longitudinal seeker is axis (34), and a second gimbal (38) pivotably mounted in the first gimbal (32) about a second gimbal axis (40) perpendicularly to the first gimbal axis (36) and which second gimbal has a cylindrical bearing sleeve (42) through which the rotor (16) is rotatably mounted about an axis of rotation (28) perpendicularly to the second gimbal axis (40),

(c) a detector (14) stationary with respect to the housing,

(d) an optical system which is of the type of a Cassegrain system and by which the field of view is imaged in the plane of the detector (14) as field of view image, having

(d_1) and annular concave mirror (50) arranged on the rotor ring (18) and facing the field of view, as primary mirror,

(d_2) a secondary mirror (52) facing the concave mirror (50) and the detector (14), the normal of which secondary mirror forms an angle (α) with the axis of rotation (28) of the rotor (16) for generating a first gyrating motion of the field of view image relative to the detector, and

(d_3) a sunshade (54) arranged on the side of the field of view of the secondary mirror (52) and extending about the secondary mirror (52), and

(d_4) a transparent annular element (56) arranged between the secondary mirror (52) and the detector (14) and transversed by the imaging path of rays which element carries a central axle portion (58) passing through the secondary mirror (52), and

(d_5) means for generating a second gyrating motion of the field of view image relative to the detector (14), and

(e) a transmission through which the secondary mirror (52)

is connected to the means for generating the secondary gyrating motion, such that each point of the field of view image makes a rosette type motion relative to the detector (14),

characterized in that

(f) as means for generating the second gyrating motion the optical axis of the concave mirror (50) forms an angle (α) with the axis of rotation (28),

(g) the hub portion (22) of the rotor (16) is mounted with its inner face through bearings (44,46) on the bearing sleeve (42) of the second gimbal (38),

(h) the bearing sleeve (42) flares out funnel-shaped (66) on the side of the field of view and carries the transparent annular element (56),

(i) the sunshade (54) is connected to the rotor (16) through retaining means (70) permitting the passage of the imaging path of rays,

(j) the secondary mirror (52) is rotatably mounted on the axle portion (58), and

(k) the gearing is a planetary gear having an internal toothing (72) fixed to the sunshade (54), an external toothing (78) connected to the secondary mirror (52), and at least one planet wheel (76) mounted on a carrier (74) affixed to the axle portion (58).

4,999,492

INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY APPARATUS

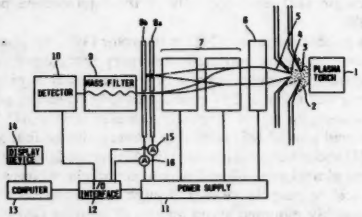
Yoshitomo Nakagawa, Tokyo, Japan, assignor to Seiko Instruments, Inc., Chiba, Japan

Filed Mar. 22, 1990, Ser. No. 497,601

Claims priority, application Japan, Mar. 23, 1989, 1-71237

Int. Cl.[5] H01J *49/26*

U.S. Cl. 250—281 **5 Claims**



1. An apparatus for carrying out inductively coupled plasma mass spectrometry to effect identification and quantification of a trace element contained in a sample solution, the apparatus comprising: a plasma torch for converting the sample solution into a plasma; means defining a sampling interface having a sampling orifice and a skimmer orifice disposed for drawing plasma from said torch to form an ion beam; a mass filter for effecting mass-separation of the ion beam to filter selected ions said mass filter having an ion beam inlet; a detector connected for detecting ions which pass through said mass filter; an optical system comprised of a lens, a deflector and a junction member disposed for efficiently directing the ion beam formed by said sampling interface into said mass filter, said junction member being electrically conductive and having a first passage aligned with said mass filter inlet; current measuring means connected to said junction member for measuring current induced in said junction member when the ion beam strikes said junction member; monitoring means connected for monitoring the state of the ion beam within said optical system on the basis of the current measured by said measuring means; and adjusting means connected for adjusting control of the ion beam by said optical system in response to the monitoring result produced by said monitoring means and the detection result produced by said detector.

4,999,493

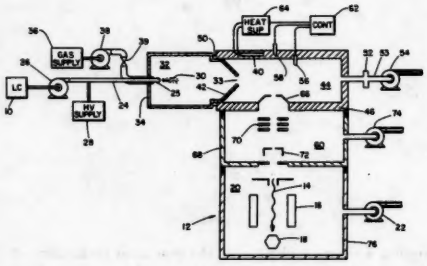
ELECTROSPRAY IONIZATION INTERFACE AND METHOD FOR MASS SPECTROMETRY

Mark Allen, Houston, Tex., and Ivor A. S. Lewis, London, England, assignors to Vestec Corporation, Houston, Tex.

Filed Apr. 24, 1990, Ser. No. 514,658

Int. Cl.[5] H01J *49/04, 49/10*

U.S. Cl. 250—288 **17 Claims**



1. Apparatus for converting a liquid effluent including sample solute of interest and solvent into ionized molecules for analysis of the sample by a mass spectrometer, the apparatus comprising:

(a) an electrospray unit for receiving liquid effluent and for discharging charged droplets, the electrospray unit including

(i) an electrospray housing defining an atmospheric pressure electrospray chamber therein,

(ii) a capillary tube for passing liquid effluent therethrough, the capillary tube having an exit within the electrospray chamber for discharging sprayed droplets containing sample solute of interest and solvent,

(iii) a voltage source for applying a voltage to the capillary tube to produce charged sprayed droplets containing sample solute of interest and solvent, the charged sprayed droplets vaporizing within the electrospray housing to produce ions, and

(iv) a restricted discharge port through the electrospray housing for outputting the ions and solvent vapor from the electrospray chamber, the discharge port being sized to maintain substantially atmospheric pressure within the electrospray chamber during spraying; and

(b) an ion generating unit for receiving clusters of ions including condensed solvent from the electrospray unit and for discharging ionized molecules to the mass spectrometer, the ion generating unit including

(i) an ion generating housing defining an ion generating chamber therein,

(ii) an ion generating unit vacuum pump for maintaining pressure within the ion generating chamber in the range of from 0.2 Torr to 10 Torr,

(iii) a temperature sensor for monitoring the temperature within the ion generating chamber, and

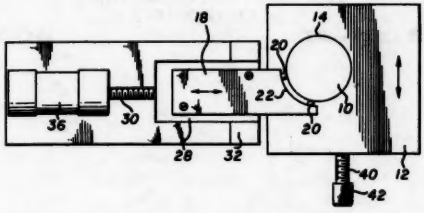
(iv) a heating unit responsive to the temperature sensor for heating the ion generating housing to a temperature of at least 120° C. to vaporize condensed solvent in the clusters of ions and produce desolvated ionized molecules of interest for analysis by the mass spectrometer.

4,999,494

SYSTEM FOR SCANNING LARGE SAMPLE AREAS WITH A SCANNING PROBE MICROSCOPE

Virgil B. Elings, Santa Barbara, Calif., assignor to Digital Instruments, Inc., Goleta, Calif.

Filed Sep. 11, 1989, Ser. No. 405,660
Int. Cl.[5] G21K 5/10
U.S. Cl. 250—306 22 Claims



1. A system for scanning a sample surface, comprising:

a scanning probe microscope head, including a probe, means for scanning said probe over a limited portion of said sample surface and for moving said probe in a direction perpendicular to said sample surface, a casing for housing said means for scanning said probe, and means on said casing for resting said head on a rigid surface positioning said probe above said sample surface; and

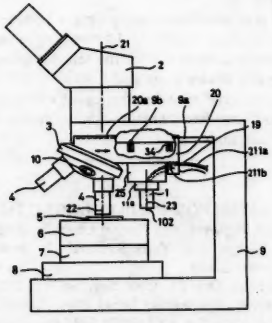
mechanical positioning means for moving said head to other portions of said sample surface, said means including arm means coupled to said casing and means for moving said arm means to position said head to said other portions of said sample surface while said head is resting on said rigid surface.

4,999,495

SCANNING TUNNELING MICROSCOPE

Chikara Miyata; Masatoshi Yasutake, and Hiroshi Ishijima, all of Tokyo, Japan, assignors to Seiko Instruments Inc., Japan

Filed Aug. 29, 1989, Ser. No. 399,910
Claims priority, application Japan, Aug. 31, 1988, 63-217491; Dec. 19, 1988, 63-320184; Dec. 19, 1988, 63-320185
Int. Cl.[5] H01J 37/26
U.S. Cl. 250—306 6 Claims



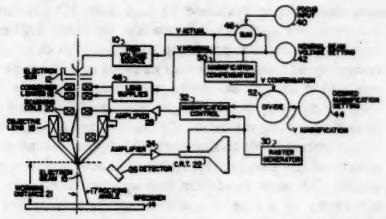
1. A scanning tunneling microscope comprising a fine movement element block having a probe and a fine movement element is disposed removably to a revolver of a microscope and a rough movement mechanism for moving a sample in the direction of said probe is disposed on a sample stage of said microscope.

4,999,496

MAGNIFICATION COMPENSATION APPARATUS

David A. Shaw, Kanata, and Glen A. Herriot, Nepean, both of Canada, assignors to Nanoquest (Canada) Inc., Ottawa, Canada

Filed Dec. 13, 1989, Ser. No. 449,806
Claims priority, application Canada, Jun. 1, 1989, 601466
Int. Cl.[5] H01J 37/256
U.S. Cl. 250—310 7 Claims



1. An apparatus for generating a magnification compensation signal for use in a scanning electron microscope (SEM) including means for generating an electron beam at a predetermined energy level in accordance with a beam energy signal, and means for scanning said beam in accordance with a scanning signal, said apparatus comprising:

refocussing means for varying said beam energy signal about a nominal value corresponding to said predetermined energy level, and

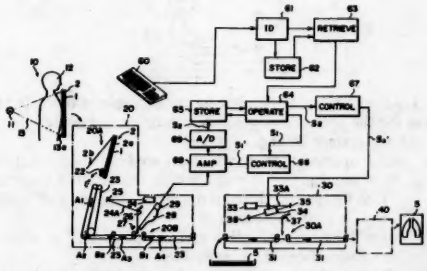
magnification compensation means connected to said refocussing means for producing a magnification compensation signal that varies in accordance with the variation of the beam energy signal from said nominal value.

4,999,497

RADIATION IMAGE READ-OUT AND REPRODUCING METHOD AND APPARATUS

Takeshi Funahashi, and Hiroshi Tanaka, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 17, 1989, Ser. No. 324,862
Claims priority, application Japan, Mar. 19, 1988, 63-66739; Oct. 12, 1988, 63-256411
Int. Cl.[5] G03B 42/00
U.S. Cl. 250—327.2 6 Claims



4. A radiation image read-out and reproducing apparatus comprising an image read-out means for detecting an image signal by reading out a radiation image from a recording medium on which the radiation image has been recorded, an operating means for carrying out image processing of the image signal, and a reproduction means for obtaining a reproduced image by use of the image signal,

wherein the improvement comprises the provision of:

(i) an ID information input means for entering ID information which gives specifics about an radiation image,

(ii) an ID information storage means for storing several pieces of ID information which were entered from said ID information input means in the past,

(iii) an ID information retrieval means for retrieving past ID information, which is the same as ID information currently entered from said ID information input means, from the ID information stored in said ID information storage means, and

means operable in response to said past ID information retrieved by said ID information retrieval means, for adjusting a read-out condition to be used for detecting an image signal from a recording medium in said image read-out means and/or an image processing condition to be used for carrying out image processing of the image signal in said operating means on the basis of image information which corresponds to said past ID information, so as to be able to obtain a second reproduced image having approximately the same gradation and approximately the same sensitivity as a first reproduced image which has been obtained by said reproduction means and which corresponds to said past ID information,

whereby the image read out for obtaining said second reproduced image is carried out using the adjusted read-out condition and/or image processing for obtaining said second reproduced image is carried out using the adjusted image processing condition.

4,999,498

REMOTE SENSING GAS ANALYZER

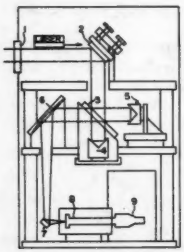
Robert N. Hunt, Wheeling, and Robert L. Sandridge, Proctor, both of W. Va., assignors to Mobay Corporation, Pittsburgh, Pa.

Filed Jun. 5, 1989, Ser. No. 361,169

The portion of the term of this patent subsequent to Jan. 3, 2006, has been disclaimed.

Int. Cl.[5] G01J *3/45, 3/00*

U.S. Cl. 250—338.5 **13 Claims**



1. An apparatus for monitoring the atmosphere of a selected area for the presence of gaseous materials comprising

(1) a container having:

(a) an opening through which infrared radiation may pass,

(b) a beamsplitter through which the infrared radiation that has passed through opening (a) passes and is split into at least two beams,

(c) at least two reflective surfaces positioned to receive radiation from the beamsplitter,

(d) means for varying the pathlength of at least one of the beams generated by the beamspliter,

(e) an off-axis parabolic reflector positioned to receive each of the combined beams reflected by (c) which off-axis parabolic reflector is characterized by a ratio of its focal length to its clear aperture in the range of from about 1 to about 32, and

(f) a cooled infrared detector positioned at the focal point of off-axis parbolic reflector (e) and

(2) a processor capable of anaylzing the output of infrared detector (f).

4,999,499

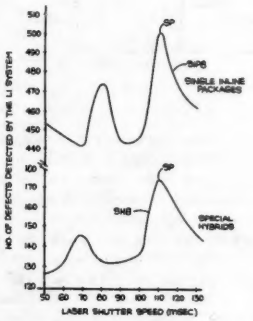
METHOD OF INSPECTING SOLDER JOINTS WITH A LASER INSPECTION SYSTEM

Surendra J. Bhatt, Fort Worth, Tex., assignor to General Dynamics Corporation, Fort Worth, Tex.

Filed Sep. 21, 1989, Ser. No. 411,030

Int. Cl.[5] G01N *25/72*

U.S. Cl. 250—342 **16 Claims**



1. A method of inspecting solder joints of a circuit card assembly with a laser inspection system comprising a laser capable of being operated at a suitable power in watts to produce a laser beam for a selectable duration for application to a solder joint of a circuit card assembly and a detector system for detecting infra red emission from the heated solder joint to determine the solder joint integrity, said method comprising the steps of:

for a given type of circuit card assembly, selecting a laser beam time duration for a laser to be operated at a given power level which is effective to result in the detection of a peak number of defective solder joints of the same type in said given type of circuit card assembly, said peak number of defective solder joints being the second peak relative to a given base determined from prior testing of said given type of solder joints in said given type of circuit card assembly at a plurality of different laser beam time durations,

operating said laser at said given power level to apply a laser beam to a solder joint of said given type in said given type of circuit card assembly for the selected time duration for heating said solder joint, and

detecting infra red emission from said solder joint resulting from said laser beam heating step to determine the integrity of said solder joint.

4,999,500

APPARATUS FOR RADIOGRAPHIC IMAGING

Amos Breskin, Rehovot, and Rachel Chechik, Beit Hanan, both of Israel, assignors to Yeda Research & Development Co., Ltd., Rehovot, Israel

Filed Oct. 31, 1989, Ser. No. 429,291

Claims priority, application Israel, Nov. 7, 1988, 88299

Int. Cl.[5] G01T *1/161*

U.S. Cl. 250—385.1 **12 Claims**

1. Apparatus for radiographic imaging comprising:

a multistage avalanche chamber receiving radiation from a multiplicity of radiation point sources on a sample and providing a multiple photon output indicative of the path of the emitted radiation through the avalanche chamber;

image intensification means receiving the photon output of the avalanche chamber;

a camera receiving an output from the image intensification means; and

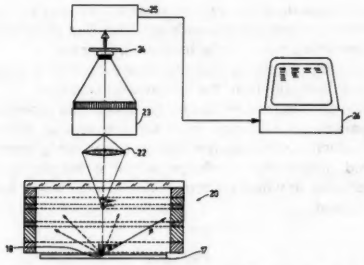


image processing means for receiving the camera output and carrying out a vector analysis on the information contained in the camera output in order to determine the location of the radiation emitting point source on the sample.

4,999,501

HIGH SPEED MULTIWIRE PHOTON CAMERA

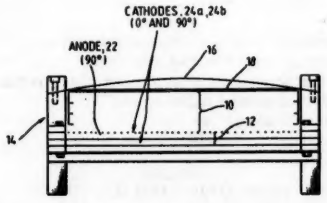
Jeffrey L. Lacy, Houston, Tex., assignor to Baylor College of Medicine, Houston, Tex.

Continuation of Ser. No. 770,113, Aug. 27, 1985. This application Nov. 28, 1988, Ser. No. 276,838

The portion of the term of this patent subsequent to Sep. 26, 2006, has been disclaimed.

Int. Cl.[5] H01J *47/20*

U.S. Cl. 050—385.1 **8 Claims**



1. In a photon camera for imaging X-ray or gamma ray radiation sources, a multiwire proportional counter detector comprising:

a. a gas-filled proportional counter envelope having a photon radiation pervious window therein for receiving radiation from said source;

b. two multiwire cathode planar electrode grids disposed within said counter envelope, said cathodes being disposed at some angle to one another;

c. an anode planar electrode grid disposed within said counter envelope between the cathode electrode grids;

d. a positive voltage means connected to said anode;

e. means disposed in said envelope for producing ionization of the gas upon passage of radiation into the envelope and for producing a consequent avalanche of electrons to said anode and an induced electrical pulse on each of said cathode grids;

f. a 20–20 nanosecond per centimeter discrete element delay line comprising at least a plurality of delay segments, each delay segment exhibiting;

a discrete tapped inductor, configured to provide phase compensating mutual inductance between inductor segments,

discrete tapped inductor is connected to at least one adjacent delay segment; and

a discrete capacitor connected between a tap of said inductor and a low inductance ground bus;

wherein a contiguous group of one or more cathode wires are directly electrically connected to a delay segment between a gap of said inductor and said discrete capacitor.

g. a plurality of cathode signal detection means, each individually connected to the anode and to a discrete delay line terminal for measuring the delay time between the occurrence of an avalanche on the anode and the arrival of the resultant signal at the respective delay line terminal; and

h. signal processing means connected to said cathode signal detection means for transforming the measured delay times into event positions so that the location of the event relative to the cathodes may be ascertained.

4,999,502

DEVICE FOR GENERATING AN INFRARED IMAGE

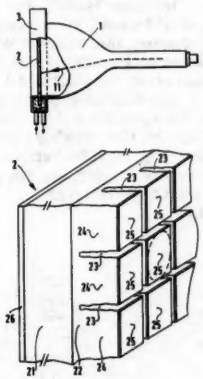
Thierry Midavaine, Paris, France, assignor to SAT (Societe Anonyme de Telecommunications), Cedex, France

Filed Sep. 28, 1989, Ser. No. 414,489

Claims priority, application France, Sep. 30, 1988, 88 12790

Int. Cl.[5] G01J *1/00*

U.S. Cl. 250—495.1 **6 Claims**



1. A device for generating an infrared image comprising:

a screen, transparent in the infrared and supporting a plurality of pixels made from a material having high emissive power in the infrared range, and means for selectively heating the material of each of said pixels;

said heating means comprising an electron beam directly bombarding said high emissive power material, and a section of said electron beam being substantially equal to the area of a pixel.

4,999,503

OPEN-TYPE PASSIVE RADIATION DETECTOR

Jean Antoine A. Andru, Maisons Alford, France, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 2, 1989, Ser. No. 346,195

Claims priority, application France, Jul. 6, 1988, 88 09429

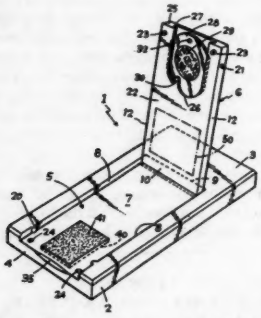
Int. Cl.[5] G01T *1/04*

U.S. Cl. 250—472.1 **10 Claims**

1. A passive radiation detector comprising a box (1) formed by a base (2) provided with a lid (6) and supporting a removable substrate (28) coated, on at least one face, with a layer (29) sensitive to the radiation to be detected wherein:

the base (2) defines a housing (5) for receiving the lid in closed position,

the housing comprises means (11, 14) for articulated connection of the lid and means (20) for immobilizing this lid in open position,



and the lid comprises, on its inner face (22) in closed position, means (26, 27) ensuring holding of the substrate and exposure thereof in open position of said lid.

4,999,504

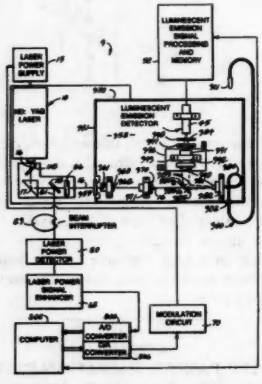
REMOTE RADIATION DOSIMETRY

Peter F. Braunlich; Wolfgang Tetzlaff; Joel E. Hegland, and Scott C. Jones, all of Pullman, Wash., assignors to International Sensor Technology, Inc., Pullman, Wash.

Continuation-in-part of Ser. No. 336,015, Apr. 10, 1989, which is a continuation-in-part of Ser. No. 882,953, Jul. 7, 1986, Pat. No. 4,839,518, which is a continuation-in-part of Ser. No. 652,829, Sep. 20, 1984, Pat. No. 4,638,163, and a continuation-in-part of Ser. No. 343,000, Apr. 24, 1989, which is a continuation-in-part of Ser. No. 897,992, Aug. 19, 1986, Pat. No. 4,825,084. This application May 31, 1989, Ser. No. 359,110

Int. Cl.[5] G01T *1/115, 1/11*

U.S. Cl. 250—484.1 39 Claims



1. A remotely setting radiation dose measuring apparatus, comprising:

at least one luminescent sensor adapted for remote mounting for exposure to radiation conditions being measured in a remote location;

at least one beam generator for producing a stimulating beam with a stimulating beam wavelength spectrum useful for stimulating the luminescent sensor to cause a controlled luminescent discharge from said luminescent sensor with a luminescent discharge wavelength spectrum;

beam power detection means for measuring the power of the stimulating beam at least once during an exposure period during which the stimulating beam is directed upon the luminescent sensor;

beam power control means for rapidly and adjustably modulating the power output of the stimulating beam to achieve a desired beam power;

at least one beam controller for controlling transmission of the stimulating beam to the luminescent sensor;

at least one remote transmission fiber for conveying the stimulating beam to the luminescent sensor;

at least one remote transmission fiber for conveying luminescent discharge from the luminescent sensor;

at least one luminescent discharge detector for detecting said luminescent discharge from the luminescent sensor and producing information indicative of a variable property of said luminescent discharge which is indicative of the radiation to which the remote luminescent sensor has been exposed.

4,999,505

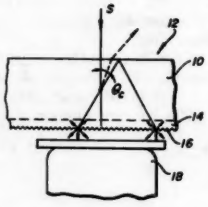
TRANSPARENT RADIATION IMAGE STORAGE PANEL

John Gasper, Hilton; Robert W. Kulpinski, Rochester, and Anthony R. Lubinsky, Webster, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 8, 1990, Ser. No. 476,918

Int. Cl.[5] G21K *4/00*

U.S. Cl. 250—484.1 5 Claims



1. A radiation image storage panel, comprising:

a transparent stimulable phosphor layer;

a filter layer for strongly absorbing stimulating radiation and transmitting emitted radiation; and

a radiation diffusing layer.

4,999,506

POSITIONING MECHANISM

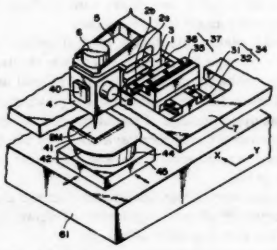
Nobutoshi Mizusawa, Yamato; Yutaka Tanaka, Yokohama, and Ryuichi Ebinuma, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 26, 1989, Ser. No. 302,184

Claims priority, application Japan, Jan. 28, 1988, 63-015859

Int. Cl.[5] G01N *21/00;* H01J *1/00*

U.S. Cl. 250—491.1 15 Claims



1. A positioning device, comprising:

a movable member;

a reference member;

a radiation sensor unit supported by said movable member for displacement relative to said movable member; and

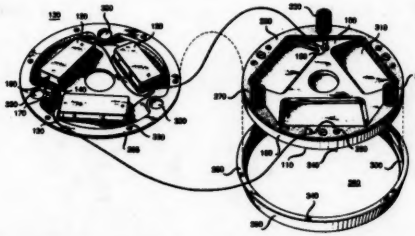
attitude determining means for selectively displacing said radiation sensor unit relative to said movable member so as to bring said radiation sensor unit into contact with said reference member to determine the attitude of said radiation sensor unit in cooperation with said reference member.

4,999,507

APPARATUS COMPRISING AN ELECTROSTATIC WAFER CASSETTE

James T. Clemens, Watchung, and Shane Y. Hong, Berkeley Heights, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 10, 1990, Ser. No. 521,765
Int. Cl.[5] H01J 37/20
U.S. Cl. 250—492.2 10 Claims



1. Apparatus comprising an electrostatic cassette assembly comprising:

(a) a casette body adapted for receiving therein a wafer-like body having upper and lower surfaces such that the lower surface of the body is supported by support means, the support means to be referred to as a "charge plate;" the charge plate comprising an electrically conductive member and a dielectric layer on the conductive member such that the body is not in electrically contact with the member; and

(b) means for producing an electrical potential difference between the member and the body;

the apparatus further comprising means for causing a processing layer on the semiconductor body to be exposed to actinic radiation;

characterized in that

(c) the assembly comprises means for storing an electrical charge, said charge storage means adapted for maintaining the electrical potential difference, without connection to a source of electrical energy external to the assembly, for a period of time that is longer than an average exposure time associated with the apparatus.

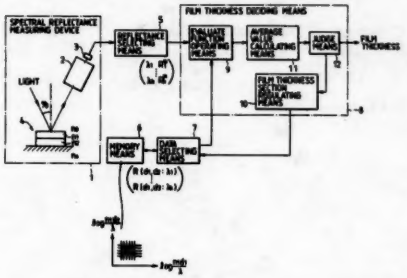
4,999,508

OPTICAL FILM THICKNESS MEASURING DEVICE FOR MEASURING TWO-LAYER FILM THICKNESSES USING SPECTRAL REFLECTANCE

Kazushi Hyakumura, Hachiouji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Dec. 29, 1989, Ser. No. 459,276
Claims priority, application Japan, Dec. 29, 1988, 63-335482
Int. Cl.[5] G01N 21/86
U.S. Cl. 250—560 4 Claims

1. An optical film thickness measuring device for measuring thickness of two layers of a two-layer film formed on a substrate, comprising a spectral reflectance measuring means for optically measuring spectral reflectance of the two-layer optical film at wavelengths different from one another, a memory means for preliminarily storing, as reflectance data, theoretical values of reflectance of said two-layer optical film determined for multiple number of pairs of the parameters (n_1d_1/λ and n_2d_2/λ) determined in conjunction with optical thickness values d_1 and d_2, refractive indices n_1 and n_2 of the first layer and the second layer respectively of said two layer optical film, and wavelengths of a light for measuring spectral reflectance, a data selecting means for reading out, from said memory means,



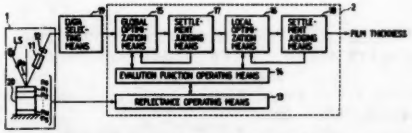
the reflectance data (n_1d_1/λ and n_2d_2/λ) corresponding to the values of at the measuring wavelengths of the measured spectral reflectance values obtained from said spectral reflectance measuring means, and a film thickness deciding means for determining thickness of each layer of said two-layer optical film on the basis of the selected reflectance data and the measured reflectance.

4,999,509

OPTICAL MEASURING DEVICE OF FILM THICKNESS

Yorio Wada, Suginami, and Kazushi Hyakumura, Hachiouji, both of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 26, 1990, Ser. No. 498,893
Claims priority, application Japan, Mar. 27, 1989, 1-74411
Int. Cl.[5] G01N 21/86
U.S. Cl. 250—560 2 Claims



1. An optical measuring device of film thickness for measuring thickness of levers of a multi-layer thin optical film consisting of layers having known refractive indices and laminated on a substrate having a known refractive index, wherein said optical measuring device of film thickness is equipped with a spectral reflectance measuring means for measuring spectral reflectance of said multi-layer thin optical film at predetermined wavelengths with measuring lights, a reflectance operating means for calculating said reflectance of the thin optical film at said predetermined wavelengths as a function only of layer thickness on the basis of said known refractive indices, an evaluation function operating means for calculating values of an evaluation function representing overall difference between the spectral reflectance at said predetermined wavelengths obtained with said spectral reflectance measuring means and the reflectance obtained with said reflectance operating means as a function only of layer thickness, a global optimization means for determining layer thickness in the vicinity of the minimum values of said evaluation function by a global optimization method, and a local optimization means for determining thickness giving the minimum values of the evaluation function by a local optimization method using the thickness determined by the global optimization means as initial values.

4,999,510

APPARATUS FOR DETECTING FOREIGN PARTICLES ON A SURFACE OF A RETICLE OR PELLICLE

Fuminori Hayano, Fujisawa; Kazunori Imamura, Tokyo; Sunao Murata, Kawasaki, and Kinya Kato, Tokyo, all of Japan, assignors to Nikon Corporation, Tokyo, Japan

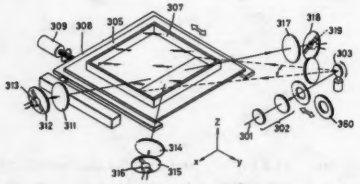
Filed Oct. 27, 1989, Ser. No. 427,365

Continuation-in-part of Ser. No. 148,691, Jan. 26, 1988, abandoned.

Claims priority, application Japan, Jan. 29, 1987, 62-17155; Feb. 25, 1987, 62-42247; May 12, 1987, 62-115649; May 18, 1987, 62-119079

Int. Cl.[5] G01N *21/86*

U.S. Cl. 250—571 7 Claims



1. An apparatus for detecting foreign particles on a surface of a reticle or pellicle, comprising:

a supplying means for supplying a light beam which forms a light spot on said surface;

a scanning means for shifting said surface and said light spot relatively so that said light spot scans the surface;

a plurality of light detectors for receiving light scattered by a foreign particle on said surface and directed in different directions, respectively, and for generating photoelectric outputs, respectively;

changing means for changing the diameter of said light beam; and

a discriminating means for discriminating the presence a foreign particle on said surface on the basis of each of said photoelectric outputs.

4,999,511

SURFACE STATE INSPECTING DEVICE FOR INSPECTING THE STATE OF PARALLEL FIRST AND SECOND SURFACES

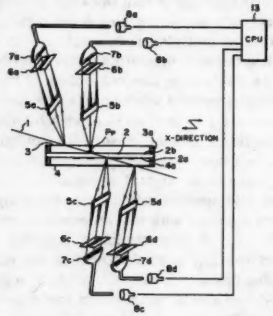
Michio Kohno, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 14, 1990, Ser. No. 493,438

Claims priority, application Japan, Mar. 15, 1989, 1-064777; Feb. 21, 1990, 2-040219

Int. Cl.[5] G01N *21/88, 21/89*

U.S. Cl. 250—572 15 Claims



1. A surface state inspecting device, usable with a sample having substantially parallel first and second surfaces coupled by a side wall, for inspecting the state of each of the surfaces, said device comprising:

irradiating means for projecting light obliquely to the sample, from the first surface side;

inspecting means for receiving light from the first surface irradiated by said irradiating means and light from the second surface irradiated with the light passed through the first surface, for inspecting the first and second surfaces; and

inspection control means effective to set a time zone for inspection of the first surface so that it does not overlap with the moment at which light impinges on a boundary between the second surface and the side wall.

4,999,512

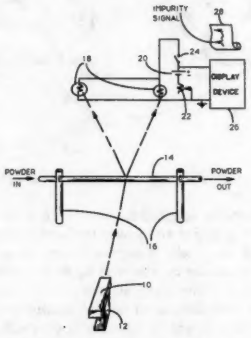
OPTICAL POWDER IMPURITY DETECTOR

Richard R. Zito, 330 N. Mathilda Ave. #606, Sunnyvale, Calif. 94086

Filed Dec. 4, 1989, Ser. No. 445,418

Int. Cl.[5] G01N *15/06*

U.S. Cl. 250—574 4 Claims



1. A powder impurity detector, comprising:

(a) a transparent tube which carries an impurity contaminated powder in a high speed flowing fluid,

(b) a laser, which acts as a sourced of collimated radiation, so that said radiation can pass through said transparent tube,

(c) an electrical means for detecting said radiation that is scattered by particles of said impurity contaminated powder,

(d) a display and recording device so that signals produced by said electrical means can be analyzed,

(e) a light-proof and dust-proof enclosure for all components, except said display and recording device, which prevents unwanted sources of radiation and dust from interfering with signals produced by said electrical means,

(f) a digital to analogue convertor so that under suitable conditions signals can be sent from said display and recording device to prevent the contaminated powders from being processed.

4,999,513

PARTICLE MEASURING APPARATUS

Yuji Ito, Chigasaki, and Moritoshi Miyamoto, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 5, 1989, Ser. No. 402,358

Claims priority, application Japan, Sep. 9, 1988, 63-226001; Sep. 9, 1988, 63-226002; Nov. 18, 1988, 63-291566

Int. Cl.[5] G01N *15/06*

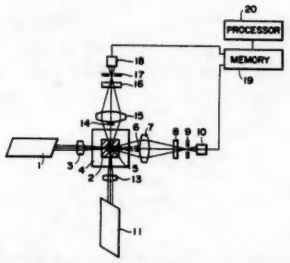
U.S. Cl. 250—575 42 Claims

1. A particle measuring apparatus including:

means for passing individual particles to be examined one by one to a portion to be examined;

first applying means for applying an irradiating light from a first direction to said portion to be examined;

second applying means for applying an irradiating light from a second direction differing from said first direction to said portion to be examined;



first and second photometering means for photometering the lights radiated from said portion to be examined by the application of lights to the individual particle to be examined, relative to said first and second applying means, respectively; and

means for measuring the individual particles on the basis of the outputs of said first and second photometering means.

4,999,514

TURBIDITY METER WITH PARAMETER SELECTION AND WEIGHTING

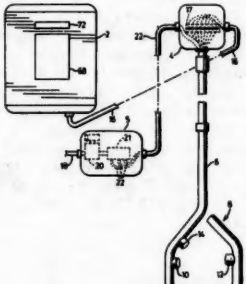
Peter L. Silveston, Waterloo, Canada, assignor to Claritek Instruments Inc., Toronto, Canada

Filed Sep. 28, 1989, Ser. No. 414,609

Claims priority, application Canada, Sep. 30, 1988, 579077

Int. Cl.[5] G01N *15/06*

U.S. Cl. 250—575 **15 Claims**



1. A turbidity meter comprising:

(a) a light source, and a lens for focusing light from the source into a beam;

(b) a first light detector producing an output signal responsive to the intensity of light incident thereon; and

(c) at least one second light detector producing an output signal responsive to the intensity of light incident thereon; said turbidity meter further comprising:

(d) means supporting said first and second light detectors in defined positions relative to the light source in a fluid under test such that said beam is directed through said fluid towards said first light detector, and each said second light detector is positioned to detect light scattered by said fluid at a predetermined angle to said beam;

(e) means to determine when the amplitude of at least one of the output signals obtained lies within a given range;

(f) means responsive to said determining means to select at least one parameter selected from the intensity of the light source and the effective sensitivity of at least one of the detectors, so that the output signal of at least one of said detectors falls within said range; and

(g) signal selection means, responsive to the selection of said at least one parameter, to select an output signal falling within said range; and

(h) weighting means to weight the selected signal in accordance with the at least one selected parameter and the identity of the signal.

4,999,515

RADIATION IMAGE RECORDING AND REPRODUCING METHOD

Takashi Nakamura, and Kenji Takahashi, both of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 36,553, Apr. 11, 1989, abandoned, which is a continuation of Ser. No. 219,848, Jul. 11, 1988, abandoned, which is a continuation of Ser. No. 834,886, Feb. 28, 1986, abandoned, which is a continuation of Ser. No. 660,987, Oct. 15, 1984, abandoned. This application Feb. 6, 1990, Ser. No. 475,877

Claims priority, application Japan, Oct. 14, 1983, 58-193161; Oct. 14, 1983, 58-193162; Sep. 25, 1984, 59-200167; Sep. 25, 1984, 59-200168

Int. Cl.[5] G03C *5/16*

U.S. Cl. 250—484.1 **10 Claims**

1. A radiation image recording and reproducing method comprising steps of:

(i) causing a divalent europium activated alkaline earth metal halide stimulable phosphor having the formula (I):

$$M^{II}X_2 \cdot aM^{II}X'_2 : xEu^{2+} \qquad (I)$$

in which M^{II} is at least one alkaline earth metal selected from the group consisting of Ba, Sr and Ca; each of X and X' is at least one halogen selected from the group consisting of Cl, Br and I, and $X \neq X'$; and a and x are numbers satisfying the conditions of $0.1 \leqq a \leqq 10.0$ and $0 < x \leqq 0.2$, respectively,

to absorb a radiation having passed through an object or having radiated from an object;

(ii) exposing said stimluable phosphor to an electromagnetic wave having a wavelength within the range of 450–1000 nm to release radiation energy stored therein as light emission; and

(iii) detecting the emitted light.

4,999,516

COMBINED BIAS SUPPLY POWER SHUT-OFF CIRCUIT

Richard R. Suter, Beaverton, and Russell R. Moen, Jr., Tigard, both of Oreg., assignors to AT&E Corporation, San Francisco, Calif.

Filed Jul. 17, 1989, Ser. No. 380,914

Int. Cl.[5] H03K *3/01, 5/13*

U.S. Cl. 307—296.3 **18 Claims**

1. A microcircuit having a plurality of microcircuit elements, and comprising:

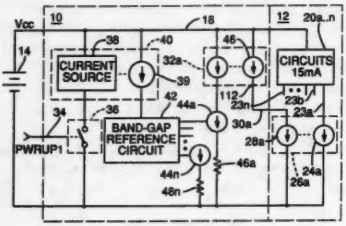
a voltage source terminal for supplying operating voltage to the microcircuit;

a functional circuit connected to the voltage source terminal;

means connected to the voltage source terminal for generating a bias current for operating the functional circuit; and

means for selectively disabling and enabling the bias current generating means thereby controlling the bias current to the functional circuit, whereby power dissipation in the

microcircuit can be limited to leakage currents of the plurality of microcircuit elements by disabling the bias



current and the functional circuit can be repetitively operated by repetitively enabling the bias current.

4,999,517

INVERTER CIRCUIT

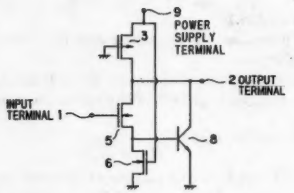
Toru Yamazaki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Nov. 8, 1989, Ser. No. 433,472

Claims priority, application Japan, Nov. 8, 1988, 63-282711

Int. Cl.[5] H03K *17/04*

U.S. Cl. 307—446 **3 Claims**



1. An inverter circuit, comprising:

a bipolar transistor including a collector of a first conductivity type being connected to an output terminal, and an emitter of said first conductivity type being connected to ground;

a first field effect transistor including a channel of a second conductivity type, an electrode selected from a source and a drain of said first field effect transistor being connected to said output terminal, a remaining electrode selected from said source and said drain of said first field effect transistor being connected to a power supply terminal, and a gate of said first field effect transistor being connected to ground;

a second field effect transistor including a channel of said first conductivity type, a gate of said second field effect transistor being connected to an input terminal, an electrode selected from a source and a drain of said second field effect transistor being connected to a base of said bipolar transistor, and a remaining electrode selected from said source and said drain of said second field transistor being connected to said output terminal; and

a third field effect transistor including a channel of said first conductivity type, an electrode selected from a source and a drain of said third field effect transistor being connected to ground, a remaining electrode selected from said source and said drain of said third field effect transistor being connected to said base of said bipolar transistor and to an electrode selected from said source and said drain of said second field effect transistor, and a gate of said third field effect transistor being connected to said power supply terminal.

4,999,518

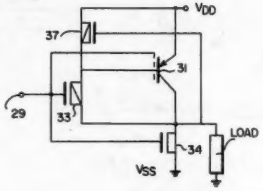
MOS SWITCHING CIRCUIT HAVING GATE ENHANCED LATERAL BIPOLAR TRANSISTOR

Sang H. Dhong, Mahopac; Chih-Liang Chen, Briarcliff Manor, and Hyun J. Shin, Mahopac, all of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Dec. 8, 1989, Ser. No. 447,984

Int. Cl.[5] H03K *19/01*

U.S. Cl. 307—446 **8 Claims**



1. An integrated MOS circuit which provides bipolar switching speed and decreased voltage drop during conduction comprising:

a laterally implemented bipolar transistor having a base connection, emitter connection, and collector connection, said emitter and collector connections separated by a polysilicon gate connection defining the width of said bipolar transistor lateral base;

a CMOS switching circuit having a CMOS logic circuit output connection connected to said bipolar transistor base connections, and a CMOS logic circuit connection connected to said gate connection, wherein said CMOS switching circuit applies simultaneous switching potential to said base connection and to said gate connection, and said bipolar transistor, collector-emitter circuit is forced during a conduction interval into an MOS device.

4,999,519

SEMICONDUCTOR CIRCUIT WITH LOW POWER CONSUMPTION HAVING EMITTER-COUPLED LOGIC OR DIFFERENTIAL AMPLIFIER

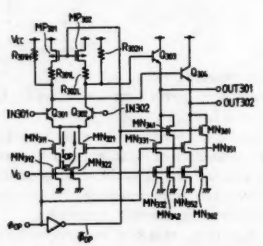
Goro Kitsukawa, Nishitama; Kazumasa Yanagisawa; Takayuki Kawahara, both of Kokubunji; Ryoichi Hori, Nishitama; Yoshinobu Nakagome, Hachiouji; Noriyuki Hamma, Kodaira; Kiyoo Itoh, Higashi, and Hiromi Tukada, Kokubunji, all of Japan, assignors to Hitachi VLSI Engineering Corporation and Hitachi Ltd., both of Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 277,992

Claims priority, application Japan, Dec. 4, 1987, 62-305639; Dec. 14, 1987, 62-315620; Jan. 20, 1988, 63-8373

Int. Cl.[5] H03K *19/86*

U.S. Cl. 307—446 **15 Claims**



1. A semiconductor circuit wherein a plurality of circuits, each of which includes a current switch and an emitter follower, are connected in parallel through emitter coupling of the emitter followers of the plurality of circuits so as to con-

struct a logical OR function; the semiconductor circuit comprising first switching means for turning "on" and "off" a switching current of said current switch, and a second switching means coupled between a load resistance of said current switch and a base of said emitter follower, both said first and second switching means being constructed of MOS transistors, the respective switching means being turned "on" and "off" by applying control signals to gates of said MOS transistors, and both said first and second switching means being turned "off" in each of the current switches of nonselected ones of said plurality of circuits, thereby to lower an output potential of said emitter follower.

4,999,520

HIGH SPEED TTL BUFFER CIRCUIT WHICH IS RESISTIVE TO THE INFLUENCE OF ALPHA-RAYS

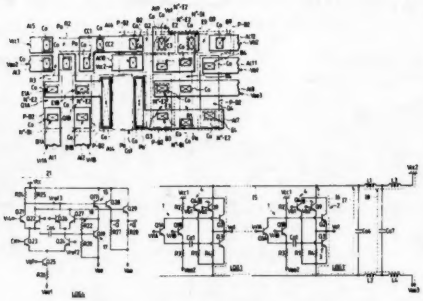
Mitsuo Usami, Tokyo; Noboru Shiozawa, Ohme; Toshio Yamada; Hiromasa Katoh, both of Hamura; Kazuyoshi Satoh, Tokorozawa; Tohru Kobayashi, Iruma; Tatsuya Kimura, Ohme; Masato Hamamoto, Ohme; Atsushi Shimizu, Ohme, and Kaoru Koyu, Ohme, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 30, 1989, Ser. No. 330,461

Claims priority, application Japan, Apr. 2, 1988, 63-81645; Apr. 12, 1988, 63-89622; Oct. 28, 1988, 63-274170

Int. Cl.[5] H03K *3/33, 17/04, 19/013, 19/088*

U.S. Cl. 307—456 **37 Claims**



1. A semiconductor integrated circuit comprising:

an inputting means for forming complementary first and second signals in accordance with an input signal supplied to an input terminal;

a first voltage level outputting means for supplying an output signal of a first voltage level to an output terminal in accordance with the voltage level of said first signal; and

a second voltage level outputting means for supplying temporarily an output signal of a second voltage level to said output terminal in accordance with said second signal formed by said inputting means depending on change of the voltage level of said input signal,

wherein said inputting means comprises a first bipolar transistor in which a base is coupled to the input terminal,

wherein said first voltage level outputting means comprises a second bipolar transistor forming an emitter follower in which a base is coupled to the collector of said first bipolar transistor, and an emitter to the output terminal, and

wherein said second voltage level outputting means comprises a third bipolar transistor and a first capacitance, said third bipolar transistor having a collector coupled to the output terminal, having a base connected to a first electrode of said first capacitance, a second electrode of the first capacitance being coupled to the emitter of the first bipolar transistor.

4,999,521

CMOS ANALOG MULTIPLYING CIRCUIT

Andreas Ruszyak, Geneva, Switzerland, assignor to Motorola, Inc., Schaumburg, Ill.

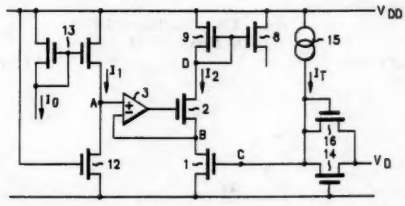
PCT No. PCT/EP88/00052, § 371 Date Oct. 17, 1988, § 102(e) Date Oct. 17, 1988, PCT Pub. No. WO88/06770, PCT Pub. Date Sep. 7, 1988

PCT Filed Jan. 25, 1988, Ser. No. 272,678

Claims priority, application United Kingdom, Feb. 25, 1987, 8704458

Int. Cl.[5] H03B *19/00;* **G06G** *7/00*

U.S. Cl. 307—498 **8 Claims**



1. A CMOS analog multiplying circuit comprising a first transistor having its current electrodes coupled between a first reference voltage line and a first node and its gate electrode coupled to a first input node having, in use, a variable input voltage such that the first transistor operates in its triode region, a second transistor having its current electrodes coupled between said first node and an output node, and a comparator for comparing a first voltage at said first node with a second variable voltage at a second input node and for controlling the gate electrode of said second transistor to keep said first and second voltages substantially equal, whereby the current through said second transistor is proportional to the product of the voltages at said first input and second input nodes.

4,999,522

ACTIVE RC FILTER CIRCUIT FOR USE AS A BAND-STOP FILTER

Yannick Deville, Ris-Orangis, France, assignor to U.S. Philips Corp., New York, N.Y.

Filed Oct. 24, 1988, Ser. No. 262,563

Claims priority, application France, Oct. 30, 1987, 87 15079

Int. Cl.[5] H03K *5/00;* **H03B** *1/00*

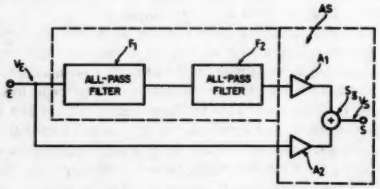
U.S. Cl. 307—520 **8 Claims**

1. An active RC filter circuit, comprising:

a first filter receptive of the filter circuit input signal and having a first order all-pass filter function;

a second filter having a first order all-pass filter function connected in series with said first filter;

a first amplifier connected for receiving the output of said second filter;



a second amplifier connected for receiving the input of the active filter circuit; and

summing means for summing the respective outputs of said first and second amplifiers for developing the output of the active filter circuit.

4,999,523

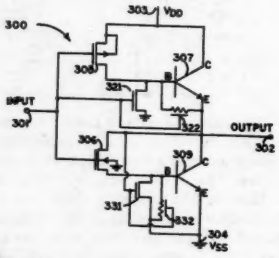
BICMOS LOGIC GATE WITH HIGHER PULL-UP VOLTAGE

Kit M. Cham, Cupertino, and Robert E. Gleason, Jr., San Carlos, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 5, 1989, Ser. No. 446,370

Int. Cl.[5] H03K *17/04*

U.S. Cl. 307—570 9 Claims



1. A BICMOS circuit comprising:

an input terminal for receiving an input signal;

an output terminal for providing an output signal as a function of said input signal;

a first output transistor having an emitter, a base, and a collector;

first input means, responsive to the input signal, to switch the first output transistor on and off;

first discharge means, responsive to the input signal, to provide a conductive discharge path between the base and the emitter of the first output transistor when the first transistor is to be switched off; and

first controllable bypass means, responsive to the input signal, to provide a partially conductive path between the base and the emitter of the first output transistor when the first output transistor is switched on, and thereby to minimize any voltage drop between the emitter and the collector of the first output transistor.

4,999,524

SOLAR POWER SIMULATOR

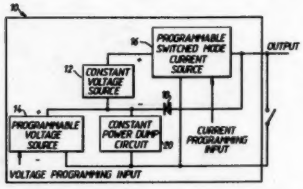
Anthony B. Williams; Kenneth M. Redford; Scott Mitchell, and Richard N. Bussell, all of Bristol, United Kingdom, assignors to British Aerospace Public Limited Company, London, England

Filed Nov. 13, 1989, Ser. No. 434,819

Claims priority, application United Kingdom, Nov. 12, 1988, 8826515; Aug. 2, 1989, 8917642

Int. Cl.[5] G05F *1/563*

U.S. Cl. 307—54 15 Claims



1. A power supply for supplying power to a switched regulator, said power supply comprising positive and negative output means, a first voltage source, a second voltage source and a programmable current source, said sources being connected in series with each other between said output means, load switch means operable to modulate the power outputs, and bypass means connected in parallel with said current source and one of said first and second voltage sources and operable so that when said output means are open circuit only said one voltage source is applied across said current source, but when said output means are shorted both said voltage sources are applied across said current source.

4,999,525

EXCLUSIVE-OR CELL FOR PATTERN MATCHING EMPLOYING FLOATING GATE DEVICES

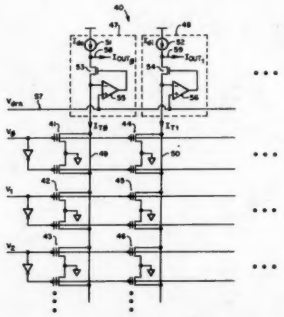
Chin S. Park, Sunnyvale, and Herman A. Castro, Shingle Springs, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.

Continuation-in-part of Ser. No. 309,247, Feb. 10, 1989. This application Mar. 17, 1989, Ser. No. 325,380

The portion of the term of this patent subsequent to Feb. 27, 2007, has been disclaimed.

Int. Cl.[5] H03K *19/21*

U.S. Cl. 307—201 16 Claims



1. A semiconductor cell for use in computing the Hamming distance between a stored weight and an input voltage comprising:

means for generating the complement of said input voltage;

a pair of floating gate devices for storing said weight, each of

said floating gate devices having a drain coupled to an output line and a source coupled to ground potential,

one of said floating gate devices having its control gate coupled to said input voltage and the other of said floating gate devices having its control gate coupled to said complement such that the current produced on said output line in response to said input voltage is related to the match between said input voltage and said stored weight.

4,999,526

APPARATUS FOR SYNCHRONIZING CLOCK SIGNALS

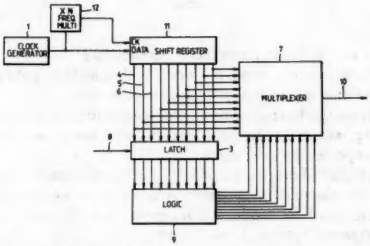
Neil F. Dudley, Middlesex, England, assignor to Crosfield Electronics Limited, London, United Kingdom

Filed Jul. 25, 1989, Ser. No. 384,384

Claims priority, application United Kingdom, Aug. 5, 1988, 8818665

Int. Cl.[5] **H03K** *5/13, 5/08, 5/159;* **H03L** *7/00*

U.S. Cl. 307—269 **2 Claims**



1. Apparatus for synchronising a clock signal to a pulse, the apparatus comprising:

a clock signal generator for generating a first clock signal having a frequency equal to that of a desired clock signal;

a shift register having a serial input port connected to said clock signal generator and a number of parallel output ports, for generating a number of time delayed versions of said first clock signal, each said time delay being less than the period of said first clock signal;

comparison means for comparing said time delayed versions of said first clock signal and said original clock signal at the time of occurrence of said pulse and for selecting as said desired clock signal, a version of said first clock signal which has changed state close to the time of occurrence of said pulse; and

frequency multiplier means, receiving said first clock signal, for generating a second clock signal having a frequency higher than said first clock signal, said second clock signal controlling the shift rate of said shift register, wherein each of said parallel output ports of said shift register is connected to said comparison means to provide said time delayed versions of said first clock signal.

4,999,527

ONE-SPOT MULTIVIBRATOR

Walter S. Gontowski, Thompson, Conn., assignor to Cherry Semiconductor Corporation, East Greenwich, R.I.

Filed May 25, 1989, Ser. No. 356,886

Int. Cl.[5] **H03K** *3/284, 3/017*

U.S. Cl. 307—273 **3 Claims**

1. A precision, high speed one-shot multivibrator operable from a stable supply voltage and responsive to an initiating trigger pulse, said multivibrator comprising:

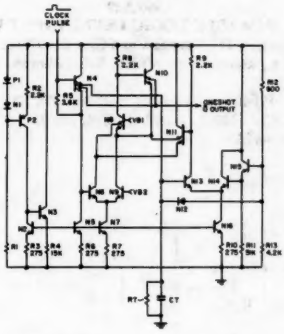
timing components including a capacitor one side of which can be charged and discharged and the other side which is maintained at a fixed potential and means for discharging said capacitor;

emitter-follower means powered from said supply voltage and responsive to said trigger pulse for selectively charging said one side of said capacitor to said supply voltage less a base-emitter drop;

a latch circuit which is set by said trigger pulse and which provides an output satate indication;

a balanced comparator providing a pair of inputs, one of which is responsive to the voltage on said one side of said capacitor;

means for providing a reference voltage which is preselected proportion of said supply voltage;



an emitter-follower separate from said comparator for providing, as the other input to said comparator, a voltage which is a base-emitter drop below said reference voltage, said comparator being connected to said latch for resetting said latch when the capacitor voltage drops below the said other input, whereby timing of the one-shot output is a stable function of the difference between said supply voltage and said reference voltage.

4,999,528

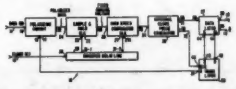
METASTABLE-PROOF FLIP-FLOP

Eugene E. Keech, 1830 E. Fairway Dr., #106, Orange, Calif. 92666

Filed Nov. 14, 1989, Ser. No. 436,425

Int. Cl.[5] **H03K** *3/356, 19/003*

U.S. Cl. 307—279 **15 Claims**



1. A method for storing digital data in a clocked electronic bistable device of the type having a data input terminal, a clock input terminal and a data output terminal, said method providing immunity from metastability, and comprising:

(a) storing a voltage level proportional to a voltage level at the data input terminal of said bistable device in a voltage storage means,

(b) operably disconnecting said voltage storage means from the influence of said voltage level at said data input terminal after occurrence of an active transition of an external clock input signal on said clock input terminal,

(c) comparing said stored voltage level held in said voltage storage means with a predetermined threshold range, which, if exceeded, causes generation of a full amplitude digital logic level, and

(d) using said full amplitude digital logic level to update said data output terminal of said bistable device to that logic state which represents said voltage level which existed at

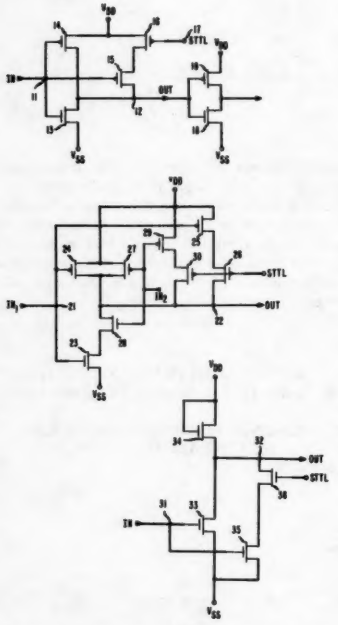
sadi data input terminal at the time of siad active transition of siad external clock input terminal.

4,999,529

PROGRAMMABLE LOGIC LEVEL INPUT BUFFER

James V. Morgan, Jr., Emmaus, and Glen E. Offord, Bethlehem, both of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 30, 1989, Ser. No. 375,120
Int. Cl.[5] H03K *19/092, 19/096, 19/017, 17/04*
U.S. Cl. 307—475 20 Claims



1. An integrated circuit including at least one input buffer having an input node and an output node, with said buffer comprising:

a first input transistor of a given conductivity type having a gate coupled to said input node, and being coupled to pull the output node toward a first power supply voltage; and

a second transistor coupled to pull the output node toward a second power supply voltage;

with the input switching level of said buffer being influenced by the ratio of the impedances of the first and second transistors,

characterized in that said input buffer further comprises:

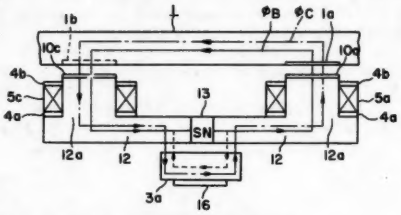
a third transistor of said given conductivity type having its drain connected to the drain of said second transistor, and its gate coupled to said input node and means for providing a level select signal for switching the channel of said third transistor into a path between said output node and a power supply voltage, whereby the input switching level of said buffer is selected.

4,999,530

LINEAR PULSE MOTOR WITH MAGNETIC ARMATURE LOCK

Hiroshi Azuma; Kenji Takemura, and Kohji Itoh, all of Tsukuba, Japan, assignors to Omron Corporation, Kyoto, Japan

Filed Aug. 29, 1989, Ser. No. 399,944
Claims priority, application Japan, Aug. 30, 1988, 63-113998[U]; Aug. 30, 1988, 63-215788
Int. Cl.[5] H02K *7/106;* G11B *21/22*
U.S. Cl. 310—12 12 Claims



1. A planar linear pulse motor, comprising:

a stator having a yoke provided with magnetic pole pieces defining a plurality of magnetic pole teeth;

an armature having a plurality of magnetic pole teeth opposing said magnetic pole teeth of said stator and slidably supported by said stator;

a plurality of drive coils provided in the associated magnetic pole pieces of said stator yoke so as to be sequentially energized to produce a magnetic flux for moving said armature relative to said stator;

a permanent magnet provided in said stator to form a closed loop of a biasing magnetic flux passing through said magnetic pole teeth of said stator and said magnetic pole teeth of said armature; and

a lock member consisting of a magnetic member supported by said armature by way of a spring member to urge said lock member against said stator;

said permanent magnet being disposed in a part of said stator in such a manner that said biasing magnetic flux produced from said permanent magnet urges said lock member toward said stator and against the biasing force of said spring member to restrict movement of said armature relative to said stator when said drive coils are not energized, and releases said lock member away from said stator under the biasing force of said spring member to permit movement of said armature relative to said stator when said drive coils are energized with a part of a magnetic flux produced from said drive coils canceling in said lock member said biasing magnetic flux produced from said permanent magnet.

4,999,531

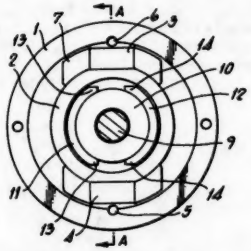
ELECTROMAGNETIC ACTUATORS

Bhaskar Mavadia, Solihull, and Jeremy A. Scarlett, Chatham, both of United Kingdom, assignors to Econocruise Limited, Warwickshire, England

Filed May 5, 1989, Ser. No. 347,742
Claims priority, application United Kingdom, May 17, 1988, 8811650
Int. Cl.[5] H02K *33/12*
U.S. Cl. 310—23 12 Claims

1. An electromagnetic actuator comprising a unitary tubular stator provided with two opposed pole pieces and having energizing windings mounted externally of said stator and a permanent magnet rotor located inside and rotatable about the major axis of said stator, means located internally of said actuator to limit the angular rotation of the rotor relative to the stator to less than about 180°, together with spring means

effective to bias the rotor towards an unactuated state, and means for generating an electrical signal corresponding to the



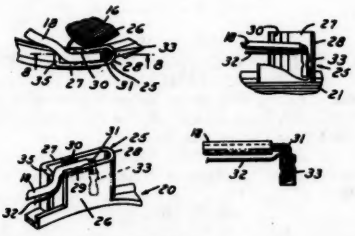
absolute angular displacement of the rotor relative to said unactuated state.

4,999,532

STRAIN RELIEF AND SUPPORT FOR ELECTRIC MOTOR WIRING

Robert J. Bartell, Owosso, Mich., assignor to Magnetek Universal Electric, Owosso, Mich.

Filed Jan. 26, 1990, Ser. No. 470,618
Int. Cl.[5] H02K *15/08*
U.S. Cl. 310—71 10 Claims



1. An electric motor comprising

a stator having radially inwardly extending circumferentially spaced polar segments,

a plastic support on each axial end of the stator,

each support having substantially the same configuration as the cross sectional configuration of the respective end of the stator and including a guide overlying the segments of the stator, and

a coil wound around each support and guide of the stator member,

each guide of the plastic support including an axially extending outwardly extending wall providing a guide for the coil,

integral strain relief devices provided on the plastic support,

said integral strain relief devices being provided about the periphery of the plastic support,

each strain relief device comprising radially spaced wall having inwardly facing teeth for receiving a covered wire,

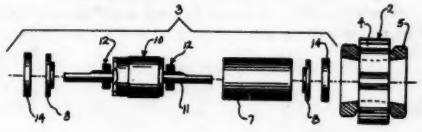
an integral wall connecting said radially spaced walls and extending axially for receiving the joined ends of connected wires.

4,999,533

DYNAMOELECTRIC MACHINE

James L. King, and Robert E. Lykes, both of Troy, Ohio, assignors to A. O. Smith Corporation, Milwaukee, Wis.

Filed Sep. 7, 1989, Ser. No. 412,855
Int. Cl.[5] H02K *15/14*
U.S. Cl. 310—90 23 Claims



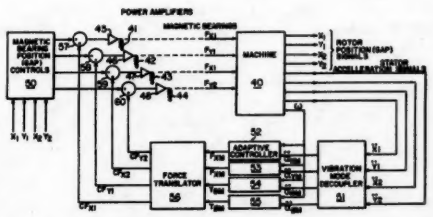
1. A dynamoelectric machine, comprising an annular stator having a cylindrical central bore of a constant diameter, a self-contained and enclosed rotor unit including a magnetic rotor core mounted on an intermediate portion of a supporting shaft, said rotor unit including an outer enclosure including a non-magnetic supporting tubular housing member located within said stator bore and secured to the stator bore to form the sole support of said housing member, said enclosure including end bearing plates having a first end plate secured to a first end of said tubular member and a second end plate secured to a second end of said tubular member, said rotor supported within said housing with said opposite ends of said shaft respectively rotatably mounted in said first end plate and said second end plate, said rotor unit located within said central bore of said stator core with an interference fit between the exterior surface of said housing member and said central opening to form essentially the sole support of said rotor unit and thereby defining a self-contained operative dynamoelectric machine.

4,999,534

ACTIVE VIBRATION REDUCTION IN APPARATUS WITH CROSS-COUPLING BETWEEN CONTROL AXES

Nikos P. Andrianos, Pittsburgh, Pa., assignor to Contraves Goerz Corporation, Pittsburgh, Pa.

Filed Jan. 19, 1990, Ser. No. 466,133
Int. Cl.[5] G05B *11/32;* H02K *5/24*
U.S. Cl. 310—90.5 11 Claims



1. An apparatus for cancellation of vibrations in a device comprising:

sensor means for measuring vibration at a plurality of locations and for generating vibration signals indicative of said vibrations,

first matrix means for combining the vibration signals from said plurality of locations to produce mode signals indicative of individual modes of vibration of said device,

adaptive means in response to said mode signals for generating mode vibration attenuation signals corresponding to said mode signals,

means for generating vibration attenuation forces applied to a reaction mass, and

second matrix means for combining said mode vibration

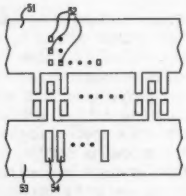
attenuation signals to produce vibration attenuation signals for application to said means for generating vibration attenuation forces.

4,999,535

SAW TRANSDUCER WITH IMPROVED BUS-BAR DESIGN

Elio A. Mariani, Hamilton Square, N.J., and Clinton S. Hartmann, Dallas, Tex., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 25, 1989, Ser. No. 412,054
Int. Cl.[5] H01L *41/08*
U.S. Cl. 310—313 B 4 Claims



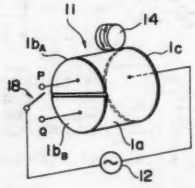
1. A surface acoustic wave transducer comprising, in combination:
- a piezoelectric substrate;
- a pair of metal bus bars positioned on said substrate parallel to and separated from each other a preselected distance, said metal bus bars having a plurality of slots along each respective length, said plurality of slots patterned in a regular array and spaced at a nominal center-to-center distance of $\lambda/3$; and
- a plurality of interdigital electrode fingers extending from each of said metal bus bars.

4,999,536

VIBRATOR-TYPE ACTUATOR

Kohzi Toda, 1-49-18, Futaba, Yokosuka, Japan

Filed May 26, 1989, Ser. No. 357,733
Claims priority, application Japan, May 26, 1988, 63-129122; Jun. 24, 1988, 63-157506; Jun. 25, 1988, 63-157712; Sep. 16, 1988, 62-231726; Sep. 16, 1988, 63-231727; Dec. 9, 1988, 63-311453
Int. Cl.[5] H01L *41/08*
U.S. Cl. 310—323 19 Claims



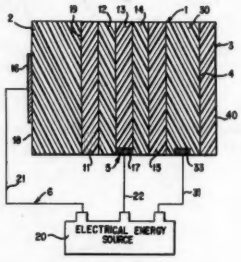
1. A vibrator-type actuator comprising:
- a pillar shaped ceramic piezoelectric body having a base surface at each end and a plurality of plane surfaces along the longitudinal direction formed at the symmetrical positions with regard to the axis direction of said piezoelectric body, said pillar shaped ceramic piezoelectric body being polarized in the longitudinal direction;
- a pair of electrodes formed on both base surfaces of said piezoelectric body; and
- a moving element made to contact with a side surface of said piezoelectric body in the longitudinal direction.

4,999,537

STRUCTURE OF ELECTRON SOURCE AND APPLICATION THEREOF TO ELECTROMAGNETIC WAVE EMITTING TUBES

Claude Weisbuch, Paris, and Bernard Epsztein, Sceaux, both of France, assignors to Thomson-CSF, Puteaux, France

Filed Jul. 3, 1989, Ser. No. 374,781
Claims priority, application France, Jul. 5, 1988, 88 09064
Int. Cl.[5] H01J *1/30, 23/04*
U.S. Cl. 313—311 14 Claims



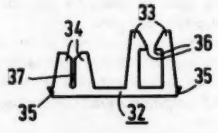
1. An electron source comprising:
- a solid having at least one face and a first semiconductor layer capable of releasing electrons under the effect of an electrical field,
- means for making said at least one of face of said solid partially transparent to at least one part of said released electrons, and for enabling said at least one part of said released electrons to be ejected from said solid,
- an unstable, composite second semiconductor layer between said first layer and said at least one face said second layer being in contact with said first layer, and having a structure with negative differential resistance, and
- means for forming, with said first layer and said composite second semiconductor layer, an electrical resonant cavity.

4,999,538

ELECTRIC LAMP INCLUDING ONE-PIECE CONTACT ELEMENTS

Marcella A. Lapré, Willemstad, Netherlands Antilles, and Winand H. A. M. Friederichs, Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 29, 1989, Ser. No. 374,517
Claims priority, application Netherlands, Jul. 1, 1988, 8801668
Int. Cl.[5] H01J *5/62*
U.S. Cl. 313—318 3 Claims



1. An electric lamp comprising
- a lamp vessel which is provided at a first end with an electric element connected to current supply conductors,
- a housing in which the first end of the lamp vessel is accommodated,
- a supply unit on a printed circuit board accommodated in the housing,
- a lamp cap provided with electrical contacts connected to the supply unit, which lamp cap is secured to the housing, contact elements being present, which are electrically connected to the printed circuit board and to a respective current supply conductor, characterized in that the contact elements each consist of a metal strip provided

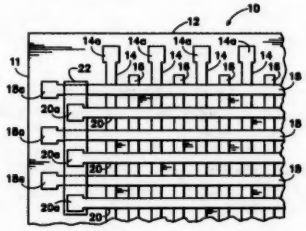
with a first pair of cooperating tongues, which holds the printed circuit board with clamping fit, and a second pair of cooperating tongues, which holds a current supply conductor with clamping fit.

4,999,539

ELECTRODE CONFIGURATION FOR REDUCING CONTACT DENSITY IN MATRIX-ADDRESSED DISPLAY PANELS

Richard E. Coovert, and Christopher N. King, both of Portland, Oreg., assignors to Planar Systems, Inc., Beaverton, Oreg.

Filed Dec. 4, 1989, Ser. No. 445,444
Int. Cl.[5] H05B 33/06; G09G 3/30
U.S. Cl. 313—505 10 Claims



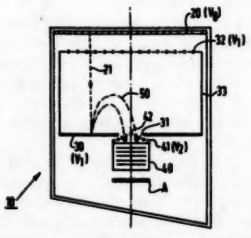
1. An electrode configuration for a TFEL panel comprising a first electrode layer deposited on a substrate including a first plurality of parallel electrodes arranged on said substrate to have first termination points a predetermined distance from an edge of said substrate, and a second electrode layer including a second plurality of parallel electrodes interleaved among the first plurality in alternating fashion, said second plurality of electrodes having termination points set back a distance farther from said edge than said first termination points, an insulating film deposited on top of at least a portion of said first electrode layer and set back from said edge so as to expose said first termination points for electrical connection wherein said second plurality of electrodes includes contact points for each electrode in said second plurality situated atop said insulating film.

4,999,540

PHOTOMULTIPLIER TUBE COMPRISING A LARGE FIRST DYNODE AND A STACKABLE-DYNODE MULTIPLIER

Pierre L'hermite, Brive, France, assignor to U.S. Philips Corp., New York, N.Y.

Filed Dec. 26, 1989, Ser. No. 456,993
Claims priority, application France, Jan. 17, 1989, 89 00486
Int. Cl.[5] H01J 43/18
U.S. Cl. 313—533 2 Claims



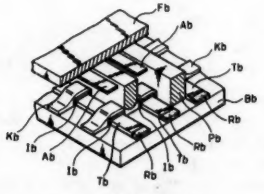
1. A photomultiplier tube (10) comprising a photocathode (20), a first dynode and a stackable-dynode electron multiplier device (40), characterized in that said first dynode (30) is constituted by a sheet extending substantially parallel to the photocathode (20), said sheet having a surface of a material emitting secondary electrons and being provided with a feedthrough aperture (31), an extracting grid (32) which, during operation, is brought to an electric potential to attract photoelectrons emitted by the photocathode (20) and being disposed between the photocathode (20) and said sheet, and in that said stackable-dynode electron multiplier device (40) is placed opposite said aperture (31) in such a manner as to collect the secondary electrons (50) emitted by the first dynode (30) and passing through the feedthrough aperture (31).

4,999,541

PLASMA DISPLAY PANEL

Dae-il Kim, and Woo-hyun Hwang, both of Kyunggi, Rep. of Korea, assignors to Samsung Electron Devices Ltd., Rep. of Korea

Filed Aug. 25, 1989, Ser. No. 398,504
Claims priority, application Rep. of Korea, Jul. 28, 1989, 89-10750
Int. Cl.[5] H01J 17/34
U.S. Cl. 313—584 1 Claim



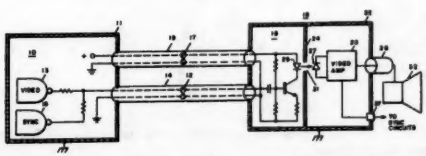
1. A plasma display panel comprising:
a front plate and a rear plate spaced to provide a discharge space between said front plate and said rear plate,
anodes attached to said front plate,
cathodes attached to said rear plate,
said anodes and cathodes being arranged in an X-Y matrix,
trigger electrodes arranged between said front plate and said rear plate in an X-Y matrix with said cathodes, and
non-conductive insulation layers disposed at positions where said cathodes and said trigger electrodes intersect each other,
said cathodes and said trigger electrodes being exposed to the discharge space between said front plate and said rear plate.

4,999,542

DATA PROCESSING DISPLAY TERMINAL

Daniel J. Norton, Hudson, N.H., assignor to Harris Data Communications, Inc., Dallas, Tex.

Filed Dec. 3, 1973, Ser. No. 421,193
Int. Cl.[5] H01J 1/52, 5/02
U.S. Cl. 315—85 17 Claims



1. A data processing display terminal utilizing a cathode ray tube display in which information-bearing electromagnetic radiations are suppressed, comprising, in combination,
(a) a cathode ray tube including a neck, a base and a plurality of connector pins protruding from said base,
(b) a conductive shield surrounding and completely enclos-

ing said pins, said base and said neck except for an opening through which said neck protrudes,

(c) a plurality of connectors including one coaxial connector mounted on said shield to accomodate electrical connections to said pins, each of said connectors with the exception of said coaxial connector including filtering means, and

(d) a video circuit coupled to said coaxial connector on said shield for supplying video information to said cathode ray tube to be displayed thereon.

4,999,543

BRILLIANCE CONTROL CIRCUIT FOR CONTROLLING THE BRILLIANCE OF FLUORESCENT DISPLAY TUBES

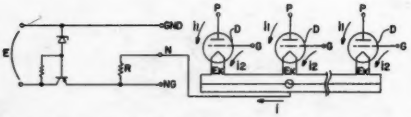
Masanori Sano; Masanori Ueyama, and Kenji Watanabe, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Aug. 26, 1988, Ser. No. 236,991

Claims priority, application Japan, Aug. 27, 1988, 62-130382[U]

Int. Cl.[5] G09G *3/10*

U.S. Cl. 315—169.3 6 Claims



1. A circuit for driving at least one fluorescent display tube having a cathode and a grid, comprising:

a grid voltage connected to said grid; and

means for controlling the brilliance of said at least one display tube to maintain said brilliance constant, said means for controlling including,

a resistor connected between an input power supply and said cathode,

said resistor compensating for variations in current from said cathode to maintain the brilliance of said at least one tube relatively constant.

4,999,544

TREE HUNG ORNAMENTAL DIMMER

Michael K. Cibor, 1027 Highland, Lincoln Park, Mich. 48146

Filed May 1, 1989, Ser. No. 345,308

Int. Cl.[5] H05B *37/00*

U.S. Cl. 315—185 S 2 Claims

1. A device for use in controlling the intensity of Christmas tree lights comprising:

a housing;

an electronic dimmer means mounted in said housing;

a first extension power cord connected to said dimmer device and having a male plug adapted to be plugged into a power outlet;

a second extension power cord connected to said dimmer device and having a female plug adapted to have Christmas tree lights to be plugged thereto;

said dimmer means including a movable element, and means enabling a reduction in the voltage applied from said power outlet to said second extension power cord, selectively controlled by movement of said element;

hanger means for said housing enabling hanging said device on a Christmas tree branch; and;

an ornamental cover piece covering said dimmer housing compatible with Christmas ornamentation, whereby said housing may be hung in a Christmas tree in an exposed position to enable ready access thereto for making power adjustments.

4,999,545

LUMINAIRE SYSTEM

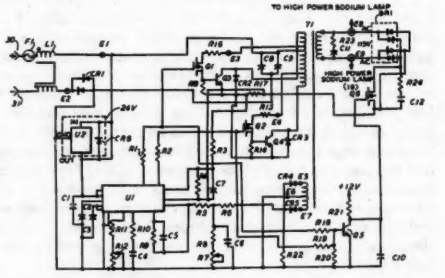
Steven E. Summer, Shirley, N.Y., assignor to Powr-Ups Corporation, Bohemia, N.Y.

Division of Ser. No. 203,077, Jun. 6, 1988, Pat. No. 4,929,873.

This application Apr. 4, 1990, Ser. No. 504,297

Int. Cl.[5] H05B *37/02*

U.S. Cl. 315—219 5 Claims



1. A circuit driven by a direct current supply for illuminating and maintaining illumination of a high pressure sodium lamp designed to be illuminated b a 115 volt 60 Hertz alternating current supply, said circuit including:

(a) input terminals adapted to be coupled to output terminals of a battery for receiving said direct current power supply from said battery for driving said circuit;

(b) converter means connected to said input terminals for converting the direct current into a quasi-square waveform;

(c) resistance-capacitance network means coupled to said converter means for establishing the frequency of said quasi-square waveform;

(d) a push-pull inverter stage coupled to said converter means for increasing the voltage level over the voltage level of the power supply driving said circuit said inverter stage including a first power stage and a second power stage, each stage connected to a center tapped step-up transformer and each stage alternating conducting for 120 degrees out of each 360 degrees of said waveform for charging a storage capacitor from said direct current supply, each stage remaining non-conductive during opposite 60 degree intervals of said wave form for permitting circulating current to pass through a shorting stage; and

(e) output terminals for coupling said quasi-square wave form voltage to said high pressure sodium lamp for maintaining said high pressure sodium lamp in an illuminated condition.

4,999,546

STARTING DEVICE FOR DISCHARGE TUBE

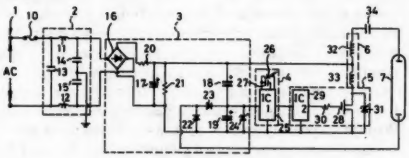
Yoshiharu Koda, and Tadashi Takashima, both of Tokyo, Japan, assignors to Kabushiki Kaisha Denkosha, Tokyo, Japan

Filed May 3, 1989, Ser. No. 346,651

Claims priority, application Japan, Jan. 30, 1989, 1-17591; Mar. 10, 1989, 1-56068

Int. Cl.[5] H05B *37/02*

U.S. Cl. 315—225 9 Claims



1. A starting device for a discharge tube, comprising rectifying means connected to an AC power source and adapted to transform an AC voltage of said AC power source into a stable DC voltage, pulse generating means driven by the DC voltage issued from said rectifying means and adapted to issue high-frequency pulses of a fixed duty ratio, adjusting means for altering the frequency of the pulses issued from said pulse generating means, high-voltage applying means for applying high voltage to said discharge tube, and switching means for driving said high-voltage applying means synchronously with the high-frequency pulses issued from said pulse generating means.

4,999,547

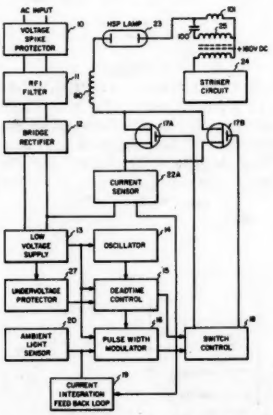
BALLAST FOR HIGH PRESSURE SODIUM LAMPS HAVING CONSTANT LINE AND LAMP WATTAGE

Sidney A. Ottenstein, Spring, Tex., assignor to Innovative Controls, Incorporated, Houston, Tex.

Filed Sep. 25, 1986, Ser. No. 911,526

Int. Cl.[5] H05B *41/38*

U.S. Cl. 315—307 4 Claims



1. A constant line and lamp wattage ballast for high pressure sodium lamps, comprising:

a direct current source that generates pulses of direct current;

a lamp circuit, having a voltage, that is interconnected with, and receives direct current pulses from, said direct current source, said lamp circuit including,

a high pressure sodium lamp, and

an inductor interconnected with said lamp;

ambient light sensing means for sensing the magnitude of ambient light present near said lamp;

a striker circuit interconnected with a high voltage induction coil, said striker circuit being adapted to generate a high voltage signal to strike said lamp when both the magnitude of the ambient light sensed by said ambient light sensing means is below a predetermined value and said lamp is not lit;

an undervoltage protector means for sensing the lamp circuit voltage, comparing it with a predetermined value, and extinguishing power to said lamp if the circuit voltage is less than the predetermined value;

a current feedback means for sensing the current present in the said lamp circuit, comparing said current with a reference value, and generating an output signal;

a pulse width modulator that, in response to said output signal of said current feedback means, varies the width of said direct current pulses;

a high frequency oscillator;

a switch that gates direct current pulses to said lamp; and

a switch control means, responsive to said oscillator, for controlling said switch and thereby controlling the frequency of said direct current pulses that power said lamp.

4,999,548

PICTURE ANALYSER TUBE WITH STREAK COMPENSATION

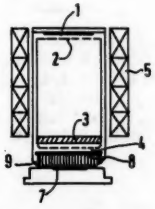
Henri Bourcier, Marolles En Brie, and Francois X. Doittau, Paris, both of France, assignors to U.S. Philips Corp., New York, N.Y.

Continuation of Ser. No. 196,901, May 19, 1988, abandoned. This application Sep. 26, 1989, Ser. No. 414,604

Claims priority, application France, May 22, 1987, 87 07220

Int. Cl.[5] H01J *29/56*

U.S. Cl. 315—370 9 Claims



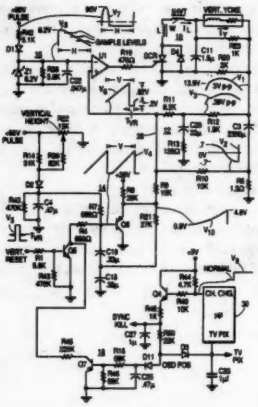
1. An image intensifier tube with streak compensation for the immobilization of the picture of a moving object and constituted by a light intensifier tube structure comprising a photocathode associated with an acceleration grid and a microchannel plate associated with another acceleration grid coupled to a CCD matrix, characterized in that the effect of streak compensation is obtained by introducing in the said structure, between the acceleration grid associated with the photocathode and the microchannel plate, a deflection means of the electron beam from the photocathode, of the type as is used in a picture dissector tube, the said deflector being opposite to the known movement of the image in order to immobilize it in the picture plane of the CCD detector during the duration of the passage of the object observed in the field of view of the device.

4,999,549

SWITCHED MODE VERTICAL DEFLECTION SYSTEM AND CONTROL CIRCUIT

James A. Wilber, Indianapolis, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Apr. 27, 1990, Ser. No. 515,901
Int. Cl.[5] H01J *29/70, 29/72*
U.S. Cl. 315—387 24 Claims



1. A deflection system, comprising:

a passive network coupled to a source of flyback pulses for generating from energy in said flyback pulses a horizontal rate drive signal substantially independent of amplitude variations in said flyback pulses and having a substantially constant DC voltage reference level;

an amplifier coupled for receiving said horizontal rate drive signal as an input and having an output for a control signal for driving a deflection coil, said control signal having a DC voltage reference level corresponding to said DC reference level of said horizontal rate drive signal;

a feedback path for a signal related to deflection current coupled from said coil as an input of said amplifier; and,

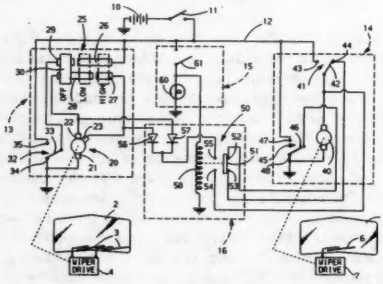
means for generating a vertical rate waveform coupled to said amplifier as an input, for pulse width modulating said control signal.

4,999,550

AUTOMATIC REAR WIPER CONTROL

Christopher W. Jones, Kokomo, Ind., assignor to Delco Electronics Corporation, Kokomo, Ind.

Filed Mar. 12, 1990, Ser. No. 491,922
Int. Cl.[5] B60S *1/08*
U.S. Cl. 318—50 1 Claim



1. A wiper control apparatus for a motor vehicle having a windshield, a rear window, an electric power supply, and a motor driveline including a transmission having both forward and reverse modes of vehicle operation;

a front wiper mechanism including a front wiper, a front electric motor mechanically connected to drive the front wiper through repeating cycles of a wipe pattern on the windshield, and a front control switch having ON and OFF conditions, the front control switch in its ON condition connecting the front electric motor to the electric power supply for activation thereof and in its OFF condition connecting the front electric motor to the electric power supply through a front park switch activated by the front electric motor to an open condition in a desired park position of the front wiper and otherwise to a closed condition, for automatic front wiper park;

a rear wiper mechanism including a rear wiper, a rear electric motor mechanically connected to drive the rear wiper through repeating cycles of a wipe pattern on the rear window, and a rear control switch having ON and OFF conditions, the rear control switch in its ON condition connecting the rear electric motor to the electric power supply for activation thereof and in its OFF condition connecting the rear electric motor to the electric power supply through a rear park switch and a disconnect switch in series, the rear park switch being activated by the rear electric motor to an open condition in a desired park position of the rear wiper and otherwise to a closed condition, for automatic rear wiper park when the disconnect switch is closed;

reverse detecting means responsive to the transmission for detecting the reverse mode of vehicle operation to generate a reverse signal; and

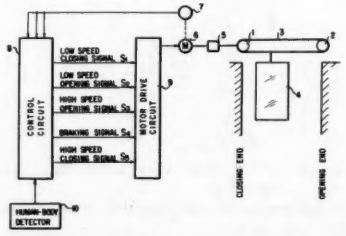
circuit means comprising an interconnect switch having a closed condition connecting the rear electric motor to the front control switch for activation thereby along with the front electric motor and an open condition disconnecting the rear electric motor from the front control switch and further comprising switch activation means responsive to the reverse detecting means to provide the closed condition of the interconnect switch and the open condition of the disconnect switch in response to the reverse signal and otherwise to provide the closed condition of the disconnect switch and the open condition of the interconnect switch.

4,999,551

METHOD FOR CONTROLLING OPENING/CLOSING OF DOOR IN AUTOMATIC DOOR SYSTEM

Yukio Yoshida, Namerikawa, and Kenzo Ohno, Toyama, both of Japan, assignors to Yoshida Kogyo K.K., Tokyo, Japan

Filed Aug. 16, 1990, Ser. No. 568,078
Claims priority, application Japan, Aug. 17, 1989, 1-210570
Int. Cl.[5] E05F *15/14*
U.S. Cl. 318—286 4 Claims



1. A method for controlling opening/closing of a door in an automatic door system comprising the steps of:

causing the door to conduct an opening operation to its opening-stop point by the action of an initial opening signal transmitted after a power supply switch is turned on

and the arrival of the door at its closing-stop has been confirmed, and measuring the length of opening stroke of the door at that time;

causing the door to conduct a closing operation to its closing-stop point when the door is stopped at the opening-stop point and no opening signal is inputted, and measuring the length of closing stroke of the door at that time; and

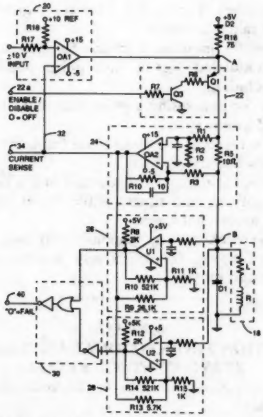
computing the difference between the measured length of opening stroke and that of closing stroke when the door is stopped at the closing-stop point, and outputting a signal indicative of the occurrence of abnormal condition if the difference in stroke is more than a preset value, or causing the door to conduct its normal opening/closing operation if the difference in stroke is less than the preset value.

4,999,552

TORQUE MOTOR DRIVER

Christopher Seipelt, Cincinnati, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 27, 1990, Ser. No. 486,037
Int. Cl.[5] H02H *7/09*
U.S. Cl. 318—434 **8 Claims**



1. A torque motor driver apparatus comprising in combination further a driver means having a first input, a second input and an output, said first input receiving a digital voltage signal, said driver means having an output current of zero milliamperes for a 50 milliampere null torque motor current,

a power source of a predetermined level, said power source operatively connected to said output of said driver means, said power source providing a current output signal, said driver means controlling said current output signal from said power source,

a feedback means operatively connected to said power source to receive said current output signal therefrom, said feedback means sensing said current output signal and providing a current sense signal in response thereto, said current sense signal being applied to said second input of said driver means,

a torque motor operatively connected to said feedback means to receive said current output signal therefrom, said torque motor operating at a predetermined torque in response to said current output signal, and,

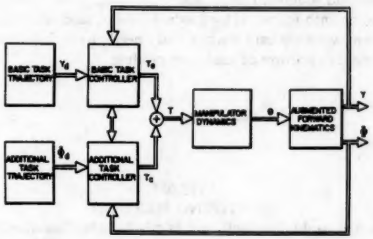
a first voltage sensing means and a second voltage sensing means, said torque motor being connected between said feedback means and ground, the junction between said torque motor and said feedback means comprising the high side of said torque motor, said first and second voltage sensing means being connected to said high side of said torque motor to sense the voltage across said torque motor, said first voltage sensing means providing a first output signal when said torque motor voltage indicates a shorted torque motor or a torque motor with a D.C. resistance less than a first predetermined value, said second voltage sensing means providing a second output signal when said torque motor voltage indicates an open torque motor or a torque motor with a D.C. resistance greater than a second predetermined value.

4,999,553

METHOD AND APPARATUS FOR CONFIGURATION CONTROL OF REDUNDANT ROBOTS

Homayoun Seraji, La Crescenta, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Dec. 28, 1989, Ser. No. 459,029
Int. Cl.[5] G05B *19/42*
U.S. Cl. 318—561 **20 Claims**



1. An apparatus for controlling a redundant robot; the apparatus comprising:

means for defining a set of end-effector coordinates corresponding to a basic task motion of said robot;

means for defining a set of kinematic functions corresponding to an additional task motion capability available as a result of the redundancy of said robot;

means for combining said set of coordinates and said set of functions to form a set of task-related configuration variables as generalized coordinates for control of said robot; and

means for dynamically modifying said configuration variables in accordance with a task-based adaptive scheme for tracking at least one reference trajectory during robot motion.

4,999,554

METHOD OF LOADING CONTROL PROGRAM FOR NUMERICAL CONTROL APPARATUS

Shigeaki Naka, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 21, 1989, Ser. No. 440,164
Claims priority, application Japan, Nov. 22, 1988, 63-295203
Int. Cl.[5] G05B *19/18*
U.S. Cl. 318—569 **8 Claims**

1. A method of loading a control program for a numerical control apparatus, comprising the steps of:

composing said program as a plurality of load modules, wherein each module includes a first judgment code at a head portion thereof, and at least a substantive portion thereafter,

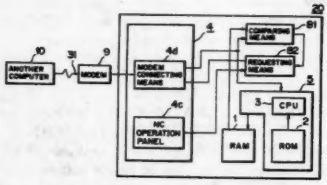
receiving a second judgment code from an external apparatus,

comparing said first judgment code with said second judgment code by a judgment code comparing means,

requesting transmission of said load module associated with said second judgment code by a load module requesting

means, when said comparing means reveals a difference between said first and second judgment codes,

transmitting said load module associated with said second judgment code when requested by said load module requesting means,



receiving through said comparing means and requesting means a portion of the load module associated with said second judgment code, and

loading into memory, by loading means, said received portion, wherein said portion only needs to include the substantive portion of said load module.

4,999,555

DIGITIZING METHOD

Etsuo Yamazaki, Hachioji, and Hiroo Nagata, Kokubunji, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

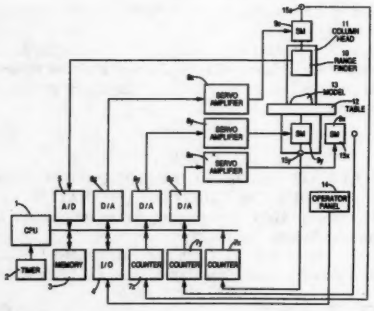
PCT No. PCT/JP88/00977, § 371 Date May 30, 1989, § 102(e) Date May 30, 1989, PCT Pub. No. WO89/03746, PCT Pub. Date May 5, 1989

PCT Filed Sep. 22, 1988, Ser. No. 362,407

Claims priority, application Japan, Oct. 23, 1987, 62-267358

Int. Cl.[5] G05B *19/18*

U.S. Cl. 318—578 **1 Claim**



1. A method for measuring a distance from a surface of a model, comprising the steps of:

providing a specified profile on a portion of the model, for use in obtaining correction data;

obtaining the correction data based on the specified profile, said correction data obtaining step including calculating a zero point correction amount and a mean value of a correction coefficient;

measuring a distance from the surface of the model to obtain measured data; and

obtaining digitized data based upon the obtained measured data and the correction data.

4,999,556

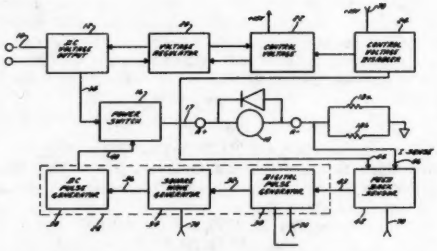
PULSE WIDTH MODULATOR MOTOR CONTROL

Stephen C. Masters, Alamogordo, N. Mex., assignor to Scott Motors, Inc., Alamogordo, N. Mex.

Continuation of Ser. No. 175,774, Mar. 31, 1988, Pat. No. 4,910,447. This application Feb. 27, 1990, Ser. No. 485,940

Int. Cl.[5] H02P *5/00*

U.S. Cl. 318—599 **17 Claims**



1. A control circuit for operating and controlling a d.c. motor driven from an a.c. signal, said circuit comprising:

(a) rectifier means, responsive to said a.c. signal and control signals applied thereto, for selectively generating a d.c. signal to said d.c. motor;

(b) pulse width modulator means for generating a pulse width modulated signal; said pulse width modulator means including:

(i) means for generating a pulse train corresponding to a desired motor speed;

(ii) means, responsive to said pulse train, for generating a square wave signal; and

(iii) means, including a transformer and a bridge circuit, for rectifying said square wave signal into said pulse width modulated signal;

(c) power switch means, responsive to said pulse width modulated signal, for selectively interrupting said d.c. signal to said motor.

4,999,557

INTEGRATION PROPORTIONAL CONTROLLER IN SERVO-CONTROL SYSTEM

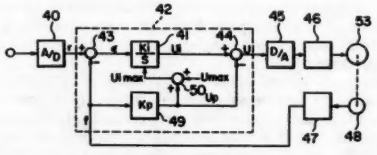
Kenji Inoue, Ise, Japan, assignor to Shinko Electric Co., Ltd., Tokyo, Japan

Filed Apr. 28, 1989, Ser. No. 345,443

Claims priority, application Japan, May 2, 1988, 63-107595; Sep. 9, 1988, 63-224717

Int. Cl.[5] G05B *11/36*

U.S. Cl. 318—609 **7 Claims**



1. An integration-proportional controller in a servo control system comprising:

means for producing a deviation signal which represents a deviation between an input speed reference signal and a feedback speed signal which has been fed back from an object to be controlled;

integrator means for integrating said deviation signal to produce a corresponding output signal;

proportional amplifier means coupled with said integrator means for amplifying said feedback signal and producing an amplified feedback signal, means connecting said am-

plifier means to said integrator means and responsive to said amplified feedback signal for setting output limit values which define therebetween a proper output value range for said output signal of said integrator means, and means for producing a control signal for said object to be controlled by subtracting said amplified feedback signal from said output signal of said integrator means; and

said integrator means including clamping means for clamping said output signal of the integrator means to one of said output limit values when an output value of said output signal is out of said proper output value range and is closer to said one output limit value than to the other said output limit value.

4,999,558

POSITION CONTROL SYSTEM

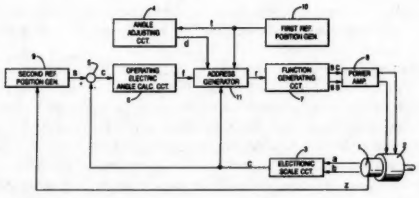
Hiromi Onodera, Nara; Toshio Inaji, Minou; Tsukasa Yoshiura, Katano; Noriaki Wakabayashi, Hirakata; Hiroshi Mitani, Daito, and Mitsuo Tokura, Kadoma, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 29, 1988, Ser. No. 277,198

Claims priority, application Japan, Dec. 1, 1987, 62-305051

Int. Cl.[5] G05B *19/40*

U.S. Cl. 318—685 22 Claims



1. A position control system comprising:

a stepping motor;

an encoder for producing polyphase signals having different phases from one another according to a rotation of said stepping motor;

current position signal generating means for generating from said polyphase signals a current position signal indicative of a current position of said stepping motor;

first reference position generating means for generating an open loop reference position command for subjecting said stepping motor to an open loop position control;

second reference position generating means for generating a closed loop reference position command for subjecting said stepping motor to a closed loop position control;

error calculating means for calculating a difference between said closed loop reference position command and said current position signal and for outputting an error signal indicative of the thus calculated difference;

operating electric angle calculating means for subjecting said error signal to a compensation calculation for said closed loop position control to obtain an operating electric angle signal indicative of a torque angle of said stepping motor;

angle adjusting means for generating an angle adjusting signal proportional to a torque angle error caused by a positional error between said stepping motor and said encoder;

control signal generating means for generating a control signal according to said open loop reference position command during said open loop position control, and for generating said control signal according to said operating electric angle signal, said current position signal and said angle adjusting signal during said closed loop position control;

current command generating means for generating current commands according to said control signal, said current commands each expressed by a predetermined mathematical function, and said current commands being indicative of polyphase currents to be supplied to said stepping motor; and

driving means responsive to said current commands for generating the polyphase currents and for supplying said polyphase currents to said stepping motor to drive said stepping motor.

4,999,559

CONTROL ELECTROMAGNET

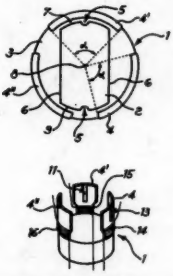
Beatriz E. Katz, Buenos Aires, Argentina, assignor to Alternative Energy Research Center Inc., Panama

Filed Dec. 22, 1988, Ser. No. 288,693

Claims priority, application European Pat. Off., Jan. 4, 1988, 88100015; Jul. 29, 1988, 88112286

Int. Cl.[5] H02P *8/00*

U.S. Cl. 318—696 17 Claims



1. A positioning apparatus for rotatably positioning a display element about a central axis comprising,

a permanent magnet rotor connected to said display element for rotation therewith, said permanent magnet rotor having arcuate pole faces disposed on opposite sides of a central axis, each of said arcuate pole faces including a centrally disposed groove extending substantially parallel to said central axis,

a stationary electromagnet stator including a base element extending around said central axis and a plurality of evenly spaced poles projecting from said base element at equal radial distances from said central axis and substantially parallel to said central axis, each of said plurality of poles having an arcuate inner surface facing toward said central axis, and at least one winding formed on each of said plurality of poles, and

circuit means for energizing said windings to magnetize selected ones of said plurality of poles to thereby position said display element.

4,999,560

ELECTRIC MOTOR RUNNING SYSTEM EMPLOYING PHOTOVOLTAIC ARRAY

Yoichi Morishima; Kazuo Kobayashi, and Isao Suzuki, all of Mie, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 872,027, Jun. 9, 1986, abandoned. This application Dec. 30, 1988, Ser. No. 293,588

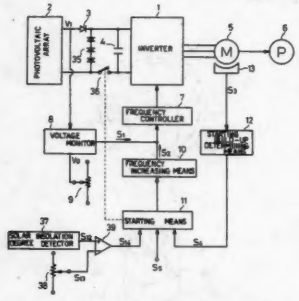
Claims priority, application Japan, Jun. 11, 1985, 60-125028; Sep. 17, 1985, 60-203312; Oct. 25, 1985, 60-237490; Nov. 29, 1985, 60-267218

Int. Cl.[5] H02P *1/28, 1/30*

U.S. Cl. 318—779 7 Claims

1. In an electric motor running system including a photovoltaic array, an inverter for inverting an output voltage of the photovoltaic array to an AC voltage, an induction motor supplied with the AC voltage from the inverter, said induction motor being provided for driving a load requiring a starting

torque larger than a normal running torque, a voltage monitor for detecting the output voltage of the photovoltaic array and comparing the output voltage of the photovoltaic array with a reference voltage, the value of which approximately corresponds to a peak power point of the photovoltaic array, to thereby generate a frequency regulation signal in accordance with a deviation between the output voltage of the photovoltaic array and the reference voltage, and a frequency controller for controlling the inverter in a feedback manner in response to the frequency regulation signal so that the inverter varies a normal running frequency thereat to maintain the output voltage of the photovoltaic array at the value of the reference voltage, and wherein an output voltage of the inverter is varied to maintain a ratio thereof to the normal running frequency thereof at a predetermined constant value, comprising:



a frequency generating means for generating a starting frequency and a starting voltage of the inverter when the inverter is started, the values of the starting frequency and starting voltage of the inverter being larger than those of respective normal running frequency and normal running voltage, said values being predetermined by the frequency controller operated in response to the frequency regulation signal, the values of the starting frequency and starting voltage being maintained at the same ratio therebetween as in the normal running of the inverter, and

a starting means for causing said frequency generating means to operate for a predetermined period prior to the feedback control of the frequency controller at the time of starting the inverter and decreasing the output frequency and the output voltage of the inverter to the normal running frequency and the normal running voltage, respectively, under feedback control of the frequency controller when the predetermined period elapses.

4,999,561

VARIABLE-SPEED DRIVING SYSTEM

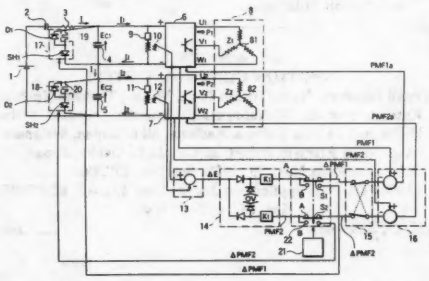
Atsushi Kaga, and Masahiko Nakamoto, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jun. 1, 1990, Ser. No. 531,689
Claims priority, application Japan, Feb. 6, 1989, 1-141795
Int. Cl.[5] H02P *5/40*
U.S. Cl. 318—812 **4 Claims**

1. A variable-speed driving system for driving at least one 3-phase induction motor each having two primary windings, with change-over of an operation mode between a variable voltage/variable frequency operation mode and a constant voltage/variable frequency mode, said system being capable of potential-dividing a D.C. power from a D.C. power supply into two D.C. powers, converting these two D.C. powers into respective 3-phase A.C. powers and supplying said 3-phase A.C. powers to the respective primary windings of said 3-phase induction motor, said system comprising:

power conversion means having one input and two outputs, said power conversion means being capable of potential-dividing the D.C. power from said power supply into two D.C. powers, converting said two powers into 3-phase A.C. powers in a variable modulation manner respectively, and delivering one of said 3-phase A.C. powers from one of said outputs to each one of said primary windings and the other of said 3-phase A.C. powers from the other of its outputs to the each other of said primary windings;

voltage adjusting means for adjusting the voltages of said D.C. powers formed by said potential-division;



voltage difference detection means for detecting the voltage difference between the D.C. powers formed by the potential division; and

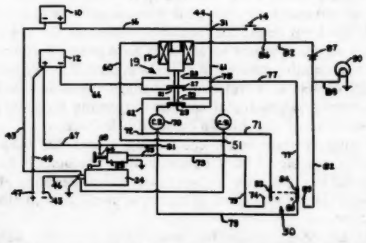
control means operative in accordance with the voltage difference detected by said voltage difference detection means, so as to control a modulation factor in said power conversion means when the operation mode is said variable voltage/variable frequency mode and to control said voltage adjusting means when the operation mode is said constant voltage/variable frequency mode, thereby equalizing two 3-phase A.C. powers which are output from said power conversion means.

4,999,562

JUMPER TERMINAL SYSTEM

William L. Hill, 5017 Thorne, La Mesa, Calif. 92041

Filed Oct. 5, 1988, Ser. No. 253,771
Int. Cl.[5] H02J *7/00*
U.S. Cl. 320—7 **2 Claims**



1. An automotive electrical system comprising a first battery means (10) having a positive terminal and a negative terminal; a second battery means (12) having a positive terminal and a negative terminal; a starter motor having a positive terminal and a negative terminal; a starter motor relay having a controlled set of contacts for energizing the starter motor; a controller switch that includes a solenoid winding, first normally-open contacts connected between the positive terminal of the first battery means and the negative terminal of the second battery means, second normally-closed contacts connected between the negative terminal of the second battery means and the negative terminal of the starter motor, third normally-open contacts connected to the positive terminal of the first battery

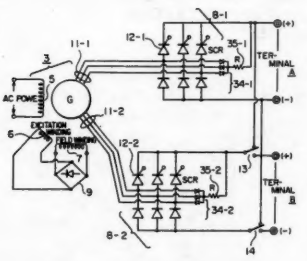
means, and fourth normally-closed contacts connected between the positive terminal of the first battery means and said controlled set of contacts, an ignition switch connected between the positive terminal of the first battery means and said solenoid winding; a first jumper cable terminal having a continuous electrical connection to the negative terminal of the first battery means and the negative terminal of the starter motor; a second jumper cable terminal connected to the positive terminal of the second battery means; a first manual switch element having a circuit-open position, and a circuit-closed position between said third normally-open contacts and the starter motor relay; and a second manual switch element having a first circuit-open position, a first circuit-closed position between the positive terminal of the first battery means and the fourth normally-closed contacts, and a second circuit-closed position between the positive terminal of the first battery means and said solenoid winding.

4,999,563

SEPARATELY POWER-FEEDING WELDING GENERATOR

Toshimichi Suzuki, Guama, Japan, assignor to Sawafui Electric Co., Ltd., Tokyo, Japan

Filed Feb. 13, 1990, Ser. No. 479,763
Claims priority, application Japan, Feb. 14, 1989, 1-33930
Int. Cl.[5] B23K *9/10*
U.S. Cl. 322—90 **3 Claims**



1. A separately power-feeding welding generator having at least two main generating windings for supplying power to loads by rectifying an induced voltage and adapted to permit said power being supplied from said two main generating windings to said loads to be separately controlled, characterized in that a thyristor is provided in a rectifying circuit for rectifying a voltage induced in at least one of said two main generating windings,

an a-c voltage detector for detecting a voltage induced in at least one of said two main generating windings and a thyristor control signal generator having such a construction that the conduction angle of said thyristor is controlled in accordance with the signal detected by said a-c voltage detector and a reference level obtained by extracting the level of electric current supplied to said loads are provided, and

a first control power supply for rectifying the voltage induced by at least one of said two main generating windings to supply as a control voltage to said a-c voltage detector and

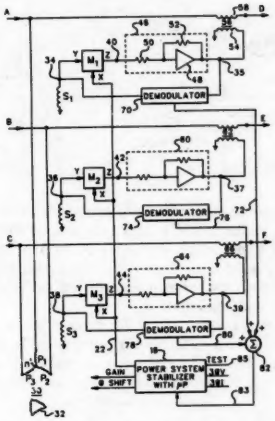
a second control power supply which is electrically independent from said first control power supply and supplies a control voltage to said thyristor control signal generator are provided.

4,999,564

POWER SYSTEM STABILIZER SYSTEM HAVING IMPROVED INTEGRITY CHECKING SCHEME

Michael J. D'Antonio, Salem; Irving A. Gibbs, Roanoke; Lawrence J. Lane, Salem, and Rodney A. Lawson, Fincastle, all of Va., assignors to General Electric Company, Salem, Va.

Filed Oct. 12, 1989, Ser. No. 420,423
Int. Cl.[5] H02P *9/00*
U.S. Cl. 322—99 **17 Claims**



1. In a system for stabilizing the operation of an electrical generator connected to a power distribution network of the type including a power system stabilizer for providing an oscillation signal having a value which normally represents generator oscillations and a modulator circuit responsive to input signals including said oscillation signal to provide a modulated output signal for varying generator excitation, means for checking for operational integrity of said power system stabilizer and said modulator circuit comprising:

(a) means for applying, to said power system stabilizer, a test signal of known amplitude and frequency, said test signal simulating generator oscillations and serving to produce a simulated oscillation signal for employment as said oscillation signal,

(b) means to store representations of time related values of said test signal;

(c) means to demodulate said modulated output signal to develop a demodulated signal;

(d) means to store representations of time related values of said demodulated signal; and

(e) means responsive to said representations of time related values of said demodulated signal and of said test signal to determine the gain and phase shift occasioned by said power system stabilizer and said modulator circuit with respect to said test signal.

4,999,565

APPARATUS FOR CONTROLLING THE REACTIVE IMPEDANCE OF A TRANSMISSION LINE

Stig L. Nilsson, Cupertino, Calif., assignor to Electric Power Research Institute, Palo Alto, Calif.

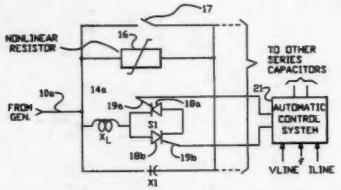
Filed Jan. 2, 1990, Ser. No. 459,991
Int. Cl.[5] G05F *1/12*
U.S. Cl. 323—210 **7 Claims**

1. Apparatus for controlling the reactive impedance of a transmission line where capacitive reactance is inserted in series in said line to compensate inductive reactance to a predetermined compensation level where the reactive impedance is lowered, said apparatus comprising:

a plurality of three or more capacitor modules, each having

a predetermined capacitive reactance, connected to each other in series to form a series combination of capacitor modules having a combined capacitive reactance represented by the arithmetic sum of said predetermined capacitive reactances, said combined capacitive reactance providing a maximum said compensation level where reactive impedance of said line is at a minimum level;

said predetermined capacitive reactance of each of said capacitor modules varying in magnitude from a maximum



to a minimum in substantially geometric steps for providing modulation of said compensation level from said maximum to a minimum, at least a portion of said modules including solid state bypass switches with control inputs for conductively bypassing a selected module or modules in said series combination;

control means connected to the control inputs of substantially all of said modules for automatically varying said combined capacitive reactance in response to a desired change in a parameter of said transmission line.

4,999,566

CURRENT CONVERTER COMPRISING CURRENT RESPONSIVE, SELF OSCILLATING, SWITCHING REGULATOR

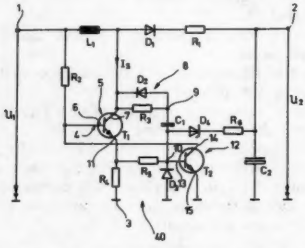
Willi Kuehn, Markgroeningen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 6, 1989, Ser. No. 446,653

Claims priority, application Fed. Rep. of Germany, Jun. 29, 1989, 3921251; Jul. 27, 1989, 3924805

Int. Cl.[5] H02M *3/156*

U.S. Cl. 323—222 **4 Claims**



1. A DC voltage converter comprising a pair of input terminals and a pair of output terminals, an inductance coupled to one of said input terminals, the input terminals being coupled to a source of primary DC voltage provided across the input terminals, and further comprising an oscillator stage coupled to said inductance, said oscillator stage switching the inductance, an oscillating current flowing through the inductance so as to generate a secondary voltage across a charge storage element, the charge storage element coupled to the inductance and across the output terminals, the oscillator stage comprising a current limiting switch having a current sensor connected in series therewith, the current limiting switch having two main terminals and a control terminal, and further comprising a control switch, the control switch having two main terminals and a control terminal, said current limiting switch comprising a first semiconductor switch, a main terminal of said first semiconductor switch being coupled to said inductance, the control terminal of said current limiting switch being coupled through a resistor to an opposite terminal of the inductance, the other main terminal of the current limiting switch being coupled to a resistor comprising said current sensor, said control switch comprising a second semiconductor switch, one of said main terminals of the control switch being coupled to the control terminal of said first semiconductor switch and the other of said main terminals being coupled to one of the input terminals, said current sensor also being coupled to one of said input terminals, the control terminal of said second semiconductor switch being coupled to said current sensor, a diode being coupled to the control terminal of the second semiconductor switch such that the diode is reversed biased by said source of primary DC voltage, one of said main terminals of said first semiconductor switch being coupled to the control terminal of said second semiconductor switch through a resistor and a capacitor connected in series with a diode being connected across said latter resistor, said diode being reversed biased by said source of primary DC voltage, a threshold device being coupled in series with a further resistor, said series combination of said threshold device and said further resistor being coupled between said control terminal of said second semiconductor switch and said charge storage element, said charge storage element being coupled to said inductance via a resistor and a rectifier diode.

4,999,567

CONSTANT CURRENT CIRCUIT

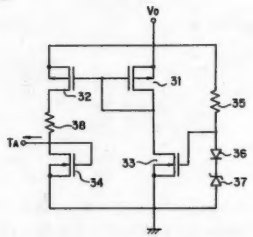
Takashi Morigami, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Dec. 20, 1989, Ser. No. 453,303

Claims priority, application Japan, Dec. 21, 1988, 63-324176

Int. Cl.[5] G05F *3/26*

U.S. Cl. 323—315 **7 Claims**



1. A constant current circuit, comprising:

a power supply for providing a predetermined voltage;

a first circuit for generating a constant voltage in an application of said predetermined voltage thereto;

a second circuit through which a first current flows in an application of said predetermined voltage thereto, said first current varying in accordance with said constant voltage;

a third circuit through which a second current flows in an application of said predetermined voltage thereto proportionally to said first current; and

an output terminal from which a constant current is supplied in accordance with said second current, wherein:

said first circuit includes a first resistance, a diode, and a Zener diode connected in series, such that a first terminal of said first resistance is connected to a higher potential of said power supply, a second terminal of said first resistance is connected to an anode of said diode, a cathode of said diode is connected to a cathode of said Zener diode, and an anode of said Zener diode is connected to a lower potential of said power supply, said constant voltage being generated at said anode of said diode;

said second circuit includes a P-MOS transistor and an

N-MOS transistor connected in series, such that a source of said P-MOS transistor is connected to said higher potential, a gate and a drain of said P-MOS transistor are connected to each other, to a drain of said N-MOS transistor, and to said third circuit, a gate of said N-MOS transistor is connected to said anode of said diode, and a source of said N-MOS transistor is connected to said lower potential; and

said third circuit includes a P-MOS transistor, a second resistance, and an N-MOS transistor connected in series, such that a source of said P-MOS transistor is connected to said higher potential, a gate of said P-MOS transistor is connected to said gate and said drain of said P-MOS transistor of said second circuit, a drain of said P-MOS transistor is connected to a first terminal of said second resistance, a second terminal of said second resistance is connected to a drain and a gate of said N-MOS transistor and said output terminal, and a source of said N-MOS transistor is connected to said lower potential.

4,999,568

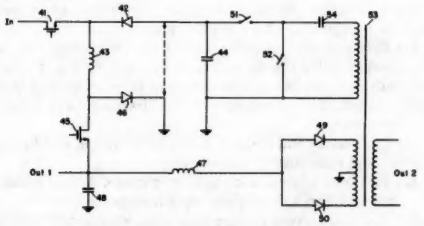
SWITCHING POWER SUPPLY COMPRISING PAIR OF CONVERTERS FOR OBTAINING CONSTANT OR SINUSOIDAL INPUT CURRENT AND FIXED OR VARIABLE OUTPUT VOLTAGE

Zdzislaw Gulczynski, P.O. Box 11633, Costa Mesa, Calif. 92627

Filed Aug. 14, 1989, Ser. No. 393,392

Int. Cl.[5] H02M *3/155, 3/28*

U.S. Cl. 323—351 **14 Claims**



1. Switching power supply converting input voltage applied to input into output voltage, comprising:

a node;

a first converter means for converting a voltage appearing between the input and node into a base voltage;

a first capacitive means for storing the base voltage;

a second converter means for converting the base voltage into the output voltage;

a second capacitive means for storing the output voltage;

a diode means for coupling the node to ground; and

a switching means for selectively applying the output voltage to the node.

4,999,569

METHOD TO CALIBRATE MAGNETO-OPTIC BASED METERING SYSTEM

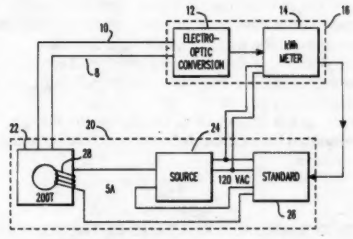
Scott J. Weikel, Raleigh, N.C., assignor to ABB Power T&D Company, Blue Bell, Pa.

Filed Sep. 1, 1989, Ser. No. 401,708

Int. Cl.[5] G01R *31/02, 35/02, 35/04*

U.S. Cl. 324—74 **9 Claims**

1. Apparatus for effecting field calibration of a portion of an electrical energy metering system, the system including a magneto-optic metering transducer connected for receiving an electrical input signal representative of one of the current component and the voltage component of the energy to be metered and for producing an optical output signal representative of the electrical input signal, and the portion of the system which is to be calibrated including circuit means having an optical input for receiving, when the metering system is in operation, the optical output signal produced by the metering transducer, a second input for receiving a signal representative of the other component of the energy to be metered, and an electrical output for generating an output signal representative of the energy delivered by the current and voltage components, said apparatus comprising: source means for providing a calibrating alternating voltage signal and a calibrating alternating current signal, each having a selected magnitude; a magneto-optic calibration transducer connected to receive one of the calibrating signals produced by said source means for producing an optical output signal representative of the one calibrating signal; means for supplying the optical output signal produced by said calibration transducer to the optical input of the circuit means, in place of the optical output signal produced by the metering transducer; means for supplying a signal representative of the other calibrating signal to th second input of the circuit means, in place of the signal representative of the other component of the energy to be metered; and energy measuring means connected to receive the calibrating signals provided by said source means and the output signal generated at the electrical output of the circuit means for providing an energy reading indicative of the relation between the energy delivered by the calibrating signals and the energy represented by the output signal generated at the electrical output of the circuit means during a selected measuring interval.



4,999,570

DEVICE FOR MAKING NON-CONTACTING MEASUREMENTS OF ELECTRIC FIELDS WHICH ARE STATICAL AND/OR VARYING IN TIME

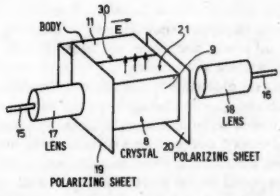
Horst Ehrler, Pfinztal, Fed. Rep. of Germany, assignor to Kernforschungeszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

Filed Nov. 8, 1988, Ser. No. 268,945

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1987, 3740468

Int. Cl.[5] G01R *29/00*

U.S. Cl. 324—96 **9 Claims**



1. A device for measuring electric fields which vary, including electric fields having frequencies extending into the GHz range, comprising:

an optically active crystal sensor having an option property which changes depending upon the strength of an applied electric field;

a body contacting said optically active crystal sensor at a common surface portion, said body having a dielectric

constant which is different from that of said optically active crystal sensor, said body having a shape and a dielectric constant such that the electric field lines pass through said optically active crystal sensor in a substantially parallel orientation and are substantially perpendicular to two opposed exterior faces of said optically active crystal sensor;

first optical conductor means connected to a first side of said optically active crystal sensor for supplying light thereto;

means for polarizing the light supplied to said optically active crystal sensor;

analyzer means connected to a second side of said optically active crystal sensor for converting shift in phase of the light transmitted through said optically active crystal sensor into a change in intensity of the transmitted light said second side being opposite said first side,

second optical conductor means connected to said analyzer means for conducting the transmitted light from said analyzer means; and

detector means for detecting change in the intensity of the transmitted light connected to said second optical conductor means.

4,999,571
CURRENT AND/OR VOLTAGE DETECTOR FOR A DISTRIBUTION SYSTEM

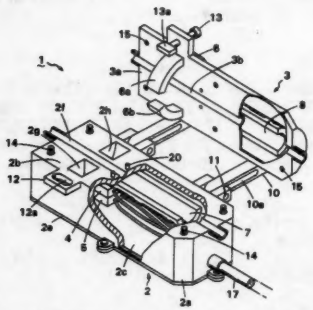
Daisuke Ishiko; Kazurou Toda, both of Hirakata; Osamu Kamada, Ikoma, and Akihiro Miura, Akashi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd. and Kansai Electric Power Co., Inc., both of Osaka, Japan

Filed Apr. 20, 1989, Ser. No. 340,934

Claims priority, application Japan, Apr. 22, 1988, 63-100766; Apr. 22, 1988, 63-100767

Int. Cl.[5] G01R *1/02, 19/00*

U.S. Cl. 324—96 **14 Claims**



1. A current detector for a distribution system, comprising a lower section, an upper section, and a fastening means for combining said lower and upper sections into one body,

said lower section comprising: a first receiving portion for receiving an electric wire of the distribution system, said first receiving portion being disposed on the upper surface of said lower section; and an optical type current sensor,

said upper section comprising a second receiving portion for receiving the electric wire, said second receiving portion being disposed on the lower surface of said upper section to face said first receiving portion, said upper section further including a U-shaped magnetic core surrounding said second receiving portion, the two end portions of said magnetic core protruding from the surface of said upper section, said lower section further comprising two recesses for receiving the two end portions of said U-shaped core when said upper and lower sections are combined into one body, and wherein said current sensor means is disposed within the gap of said U-shaped magnetic core when said upper and lower sections are combined into one body.

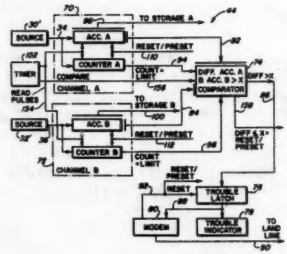
4,999,572
REDUNDANT PULSE MONITORING IN ELECTRIC ENERGY METERING SYSTEM

Dale M. Bickford, Rochester, N.H.; Richard G. Farnsworth, York, Me.; Samuel G. Hardy, New Durham, N.H.; John R. Hawley, Durham, N.H., and Albert R. Varney, Jr., Rochester, N.H., assignors to General Electric Company, Somersworth, N.H.

Continuation of Ser. No. 246,067, Sep. 19, 1988, abandoned. This application Oct. 16, 1989, Ser. No. 423,530

Int. Cl.[5] G01R *11/36, 13/38;* **G08C** *5/12*

U.S. Cl. 342—103 R **45 Claims**



30. In a power distribution system, apparatus for metering electric energy usage by a load comprising:

(a) first and second pulse means for generating first and second pulse signals respectively, said first and second pulse signals being representative of substantially duplicate independent measures of the electric energy usage by said load;

(b) first and second counter means for counting said first and second pulse signals respectively;

(c) first and second accumulator means for accumulating said first and second pulse signals respectively;

(d) first and second storage means for storing said first and second pulse signals respectively as redundant backup energy usage data;

(e) comparator means in communication with said first and second counter means and said first and second accumulator means for comparing the contents of said first and second accumulator means upon either of said first and second counter means achieving a prescribed count, said comparator means further including means for generating a trouble signal indicative of a system abnormality affecting the normal accumulation of said first and second pulse signals when the difference between the contents of said first and second accumulator means exceeds a prescribed value; and

(f) means for providing a reset signal to said first and second counter means and said first and second accumulator means, following the comparing by said comparator means.

4,999,573
METHOD AND APPARATUS FOR MEASUREMENT GATE DISPLAY

Atul Tambe, San Jose, and Michael Wilson, Saratoga, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

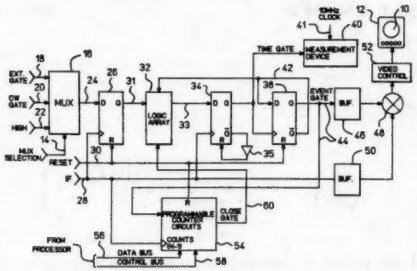
Filed Jul. 31, 1989, Ser. No. 388,787

Int. Cl.[5] G01R *13/20, 23/16*

U.S. Cl. 324—121 R **9 Claims**

9. A method for providing a visual indication of the location and duration of a measurement gate relative to the cycles of a signal being measured comprising the steps of:

generating a first time gate signal, synchronized with the cycles of the signal being measured, at the start of a measurement gate, for starting a measurement;
initiating a measurement in response to said first time gate signal;
generating a second time gate signal, synchronized with the cycles of the signal being measured, at the close of the measurement gate, for terminating the measurement;
terminating the measurement in response to said second time gate signal; and
generating an event gate signal in response to said first time



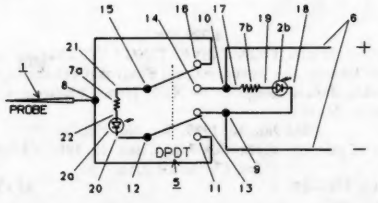
gate signal and said second time gate signal beginning with the first time gate signal and ending with the second time gate signal;
summing said event gate signal with said signal being measured to produce a display signal, said summing performed near where said event gate is generated, whereby differential delays between the signal being measured and the event gate signal are minimized;
utilizing said display signal to provide a visual indication of the signal being measured having an altered visual indication for the cycles of the signal being measured occurring during the measurement gate.

4,999,574

SWITCHABLE AUTOMOTIVE CIRCUIT TEST LIGHT

Edward L. Stephens, 917 N. Oakland, St. Johns, Mich. 48879

Filed Nov. 1, 1989, Ser. No. 429,967
Int. Cl.[5] G01R *19/14*
U.S. Cl. 324—133 **2 Claims**



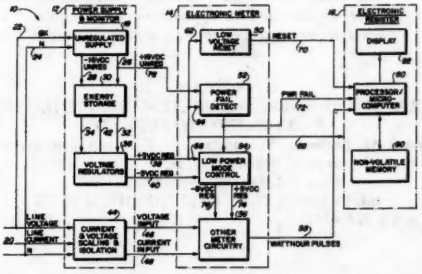
1. A portable hand held continuous self monitoring circuit tester, for detecting problems in automotive 12 volt electrical systems, computer controlled circuits comprising:
a case rectangular in shape, one end having an electrically conductive probe, the other end having first and second of electrical leads
said first electrical lead connecting to the positive side of a storage battery of the automotive system being tested
said second electrical lead connecting to the negative side of a storage battery of the automotive system being tested;
an upper portion of said case having first and second light emitting diodes, and a double pole double throw switch protruding through said case
said first light emitting diode to continuously monitor said electrical leads
said second light emitting diode used in testing the automotive system; first, second, and third electrical circuits enclosed in said case
said first circuit comprising said first light emitting diode in series with a first current limiting resistor of approximately 680 ohms connected between said first and said second electrical leads
said second circuit comprising said second light emitting diode in series with a second current limiting resistor of approximately 680 ohms connected between the electrical probe through the switch to said first electrical lead
said third circuit comprising said second light emitting diode in series with said second current limiting resistor of approximately 680 ohms connected between the electrical probe through said switch to said second electrical lead;
said switch to change from said second to said third circuit.

4,999,575

POWER SUPPLY AND MONITOR FOR CONTROLLING AN ELECTRICAL LOAD FOLLOWING A POWER OUTAGE

Warren R. Germer, Dover, N.H., assignor to General Electric Company, Somersworth, N.H.

Filed Sep. 25, 1989, Ser. No. 412,036
Int. Cl.[5] G01R *11/64, 15/08*
U.S. Cl. 324—142 **23 Claims**



7. In a metering system of the type for measuring electrical energy consumption, the combination comprising:
(a) an AC supply for supplying electrical energy;
(b) a power supply, connected to said AC supply and responsive to electrical energy therefrom, for producing an unregulated DC voltage;
(c) energy storage means, including a current regulator, connected to said power supply, for storing electrical energy from said unregulated DC voltage and having sufficient storage capacity to effectively maintain the magnitude of said unregulated DC voltage at a prescribed voltage level for a predetermined period of time following a loss of said AC supply, said current regulator monitoring said unregulated DC voltage and being responsive thereto, following a loss of said AC supply, when the magnitude thereof decays from a first prescribed voltage level to a second prescribed voltage level to control the rate that said energy storage means gives up its stored electrical energy and sustain said unregulated DC voltage at substantially said second voltage level for said predetermined period of time;
(d) a voltage regulator, responsive to said unregulated DC voltage, for producing a regulated DC voltage of a prescribed magnitude, said voltage regulator regulating said regulated DC voltage at its prescribed magnitude for at least said predetermined period of time;
(e) an electronic register, coupled to said voltage regulator and being powered by the regulated DC voltage produced thereby, said electronic register including,

(i) a processor, having a volatile data storage, for storing electrical energy consumption data as represented by data pulses provided thereto, and

(ii) a non-volatile data storage in communication with said processor; and

(f) an electronic meter, coupled to said voltage regulator and being powered by the regulated DC voltage produced thereby, and being connected to said AC supply, for measuring electrical energy consumption and providing the data pulses to said processor for storage, in said volatile data storage, as electrical energy consumption data, said electronic meter including,

(i) detect means responsive to said unregulated DC voltage, upon the loss of said AC supply, for providing a power fail detect signal to said electronic register to signal said processor to write data from its volatile data storage into said non-volatile data storage when the magnitude of said unregulated DC voltage decays to a prescribed threshold, the writing of the data from said volatile data storage to said non-volatile data storage being completed during said predetermined period of time,

(ii) reset means, connected to said voltage regulator and responsive to a decrease in the magnitude of the regulated DC voltage therefrom to a prescribed value, for providing a reset signal to said processor, the decrease occurring substantially at the end of said predetermined period of time, and

(iii) means, responsive to the power fail detect signal from said detect means, for powering down said electronic meter by disabling the application of the regulated DC voltage provided thereto from said voltage regulator.

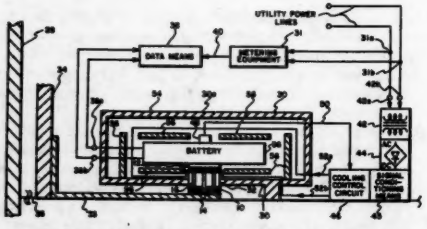
4,999,576
ELECTRICAL-ENERGY-SUPPLYING DEVICE HAVING AN EXTENDED STORAGE LIFE

Lionel M. Levinson, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jul. 31, 1989, Ser. No. 387,183

Int. Cl.[5] G01R *21/06;* **H02J** *9/00;* **H01M** *10/50*

U.S. Cl. 324—142 **10 Claims**



1. A TOU watt-hour meter for measuring electrical energy usage from a utility line, comprising:

metering means, having at least two terminals for connecting to the utility line, for measuring electrical energy usage;

data means, coupled to said metering means, for recording electrical energy usage and time of use information;

battery means for supplying electrical energy to said data means to maintain accurate time information if the utility line energy is interrupted;

a thermoelectric working module having a cold junction thermally connected to said battery means, and a hot junction thermally connected for heat dissipation away from said battery means; and

cooling control means for causing said thermoelectric working module to transfer heat energy away from said battery means when said battery means exceeds a selected temperature.

4,999,577
METHOD FOR CONTACTLESS TESTING OF CONDUCTING PATHS IN A SUBSTRATE USING PHOTON-ASSISTED TUNNELING

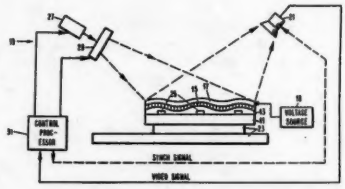
Johannes G. Beha, Waedenswil; Armin U. Blacha, Rueschlikon; Rolf Clauberg, Gattikon, and Hugo K. Seitz, Wollerau, all of Switzerland, assignors to International Business Machines Corporation, Armonk, N.Y.

Division of Ser. No. 107,441, Oct. 9, 1987, Pat. No. 4,868,492. This application Jun. 15, 1989, Ser. No. 366,572

Claims priority, application European Pat. Off., Oct. 9, 1986, 86114712.2

Int. Cl.[5] G01R *31/02*

U.S. Cl. 324—158 R **10 Claims**



1. A method for contactlessly testing the integrity of conducting paths on or within a nonconducting substrate, there being at least one conducting pad on the surface of said substrate comprising:

forming an electrooptic layer on at least a part of the surface of one pad;

forming a thin conducting layer on said electrooptic layer;

applying a voltage to said conducting layer;

contactlessly generating charges in at least one pad inducing a voltage thereon and on pads electrically connected therewith, substantially no charges being generated in said substrate;

directing an incident polarized optical wave onto said at least one pad with said electrooptic layer thereon, from which pad reflects a polarized optical wave, said electrooptic layer and said conducting layer being transparent to said incident polarized optical wave and said reflected optical wave, the polarization of said reflected wave passing through said electrooptic layer being dependent on the voltage difference between said conducting layer and said at least one pad with said electrooptic layer thereon; and

detecting the polarization of the optical wave passing through said electrooptic layer.

4,999,578
FUNCTION INSPECTING SYSTEM

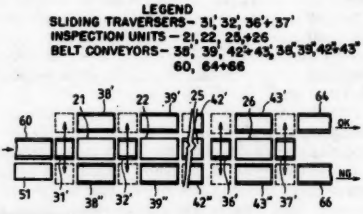
Mitsuo Ohashi; Jun Nakagawa, and Kuniyoshi Takahashi, all of Osaka, Japan, assignors to NEC Home Electronics Ltd., Osaka, Japan

Filed Jan. 13, 1989, Ser. No. 296,779

Claims priority, application Japan, Jan. 20, 1988, 63-10269

Int. Cl.[5] G01R *1/02*

U.S. Cl. 324—158 F **13 Claims**



1. A function inspecting system comprising:

a plurality of inspection means for inspecting respective functions of an appliance each having an electronic circuit conveyed thereto;

a distributive conveyance means for conveying an appliance to and from any of said inspection means, the distributive conveyance means comprising a plurality of belt conveyors cooperating with a plurality of sliding traversers interspersed therewith, each belt conveyor having a generally planar upper surface upon which each applicant is conveyed, each sliding traverser traversing in a plane generally parallel to the planar upper surface of each belt conveyor, each sliding traverser being operable to allow the appliance to be conveyed from one belt conveyor to the next belt conveyor, each sliding traverser also being operable to convey an appliance from one belt conveyor to the inspection means and from the inspection means to the next belt conveyor, such that an appliance is conveyed onto the each inspection means as is necessary to inspect the functions of the appliance and bypasses inspection means where no inspection is necessary; and

an automatic control means for controlling the operation of said distributive conveyance means.

4,999,579

METHOD AND APPARATUS FOR MEASURING THE ROTATIONAL SPEED OF A SHAFT

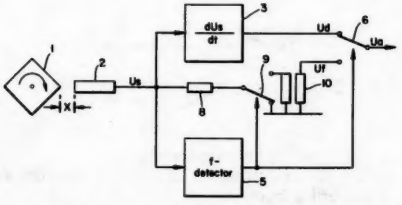
Rüb Winfried, Neustadt/Main, Fed. Rep. of Germany, assignor to Manessmann Rexroth GmbH, Lohr/Main, Fed. Rep. of Germany

Filed Aug. 24, 1989, Ser. No. 397,963

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1988, 3829390

Int. Cl.[5] G01B *7/14*; G01P *3/48, 3/54*

U.S. Cl. 324—166 **8 Claims**



2. An apparatus for measuring the angular velocity (or rpm) of a measuring body the distance of which body from a sensor varies periodically as the body is rotated comprising:

a sensor which emits a distance signal dependent on the distance from the sensor to the measuring body, said sensor being disposed such that when the measuring body is rotated, the distance to a partial surface of the measuring body varies continously;

a converting circuit for converting the distance signal to a frequency-dependent signal in the converter circuit;

a differentiating circuit for time-differentiating the continuously varying distance signal of the sensor, to yield a differential signal; and

an output circuit for detecting the frequency of the distance signal and/or the level of the differential signal, and, when said frequency and/or level is below a predetermined value, said output circuit delivers, as the rpm signal, the differential signal instead of the frequency-dependent signal which comes from the converter circuit.

4,999,580

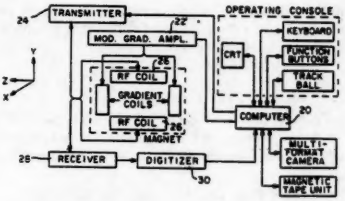
MAGNETIC RESONANCE IMAGING AND SPECTROSCOPY USING A SINGLE EXCITATION PULSE FOR SIMULTANEOUS SPATIAL AND SPECTRAL SELECTIVITY

Craig H. Meyer, and John M. Pauly, both of Menlo Park, Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Jun. 20, 1989, Ser. No. 368,765

Int. Cl.[5] G01R *33/28, 33/44*

U.S. Cl. 324—309 **10 Claims**



7. Apparatus for obtaining magnetic resonance signals from a body which are spatially and spectrally selective comprising

(a) means for applying a static magnetic field (Bo) to said body thereby aligning nuclear spins,

(b) means for applying a modulated magnetic gradient (G(t)) to said body, said gradient having a modulation frequency, Ω, which determines the frequency spacing of spectrally detected signals,

said gradient being applied for a period of time (T) sufficiently long so that the spectral transition band is narrower than the difference in frequencies of the responses of two spectral components,

(c) means for applying an RF excitation pulse (B(t)) to said body to tip said nuclear spins, said RF excitation pulse being related to said modulation frequency, Ω, and said period of time, T, whereby resulting magnetic resonance signals are spatially and spectrally dependent, and

(d) means for detecting said magnetic resonance signals.

4,999,581

MAGNETIC RESONANCE IMAGING SYSTEM

Kozo Satoh, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

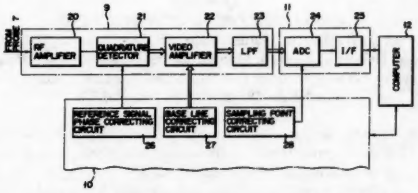
PCT No. PCT/JP88/01005, § 371 Date May 30, 1989, § 102(e) Date May 30, 1989, PCT Pub. No. WO89/02723, PCT Pub. Date Apr. 6, 1989

PCT Filed Sep. 30, 1988, Ser. No. 362,443

Claims priority, application Japan, Sep. 30, 1987, 62-244355

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—309 **14 Claims**



1. A magnetic resonance imaging system which includes magnetic resonance signal detecting means (1, 2, 3, 4, 7, 8, 10) for applying pulses of an RF magnetic field and slicing, phase-encoding, and reading gradient magnetic fields to an object to be examined placed in a uniform static magnetic field in accordance with a predetermined sequence, thereby detecting a magnetic resonance signal from said object to be examined,

receiving means (9) for phase-sensitive detecting and amplifying the magnetic resonance signal, data acquiring means (11) for sampling and digitizing the magnetic resonance signal obtained by said receiving means (9), and image reconstructing means (12) for performing image reconstruction on the basis of sampling data of the magnetic resonance signal obtained by said data acquiring means (11), comprising:

a reference signal phase correcting circuit (26) for correcting a phase of a phase-sensitive detecting reference signal in said receiving means (9);

a base line correcting circuit (27) for correcting a base line of the magnetic resonance signal detected by said magnetic resonance signal detecting means (1, 2, 3, 4, 7, 8, 10); and

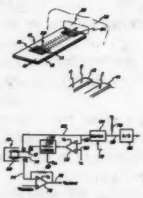
a sampling point correcting circuit (28) for correcting a sampling point of the magnetic resonance signal in said data acquiring means (11).

4,999,582

BIOSENSOR ELECTRODE EXCITATION CIRCUIT

Robert A. Parks, Springport, and Bradley E. White, Zionsville, both of Ind., assignors to Boehringer Mannheim Corp., Indianapolis, Ind.

Filed Dec. 15, 1989, Ser. No. 451,108
Int. Cl.[5] G01R *27/02*
U.S. Cl. 324—438 **6 Claims**



1. A circuit for applying a potential to a biosensing electrode, said electrode, when properly inserted in a connector, contacted by a pair of spaced-apart contacts, the combination comprising:

operational amplifier means having a pair of inputs and an output, one input connected to an excitation potential;

switch means coupled between said operational amplifier means and a first of said contacts, said switch means exhibiting an internal impedance;

feedback circuit means connected between a second of said contacts and a second input to said operational amplifier means, to feed back the potential at said second contact to said second input, whereby the output of said operational amplifier means is maintained at a level which compensates for a potential drop across said switch means and applies to said first contact a potential bearing a predetermined relationship to said excitation potential.

4,999,583

AMPLIFIER DRIVE CONTROLLER

Robert D. Washburn, Malibu; Robert F. McClanahan, Valencia, and Robert S. Wedeen, Manhattan Beach, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Feb. 28, 1990, Ser. No. 486,574
Int. Cl.[5] H03G *3/30*
U.S. Cl. 330—86 **3 Claims**

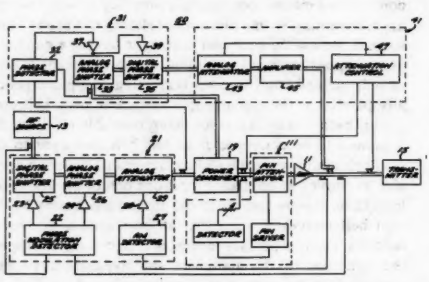
1. A drive control circuit for an amplifier comprising:

a power combiner for combining an RF input signal with a feedback signal to provide a composite RF signal;

power control means responsive to said composite RF signal for providing to the input of the amplifier a selectively attenuated replica of said composite RF signal, said power control means selectively attenuating said composite RF signal when the power of said composite RF signal exceeds a predetermined threshold;

feedback means connected between the output of the amplifier and said power combiner for providing a portion of the output of the amplifier as said feedback signal; and

feedback attenuator means for controlling the level of said feedback signal provided to said power combiner as a



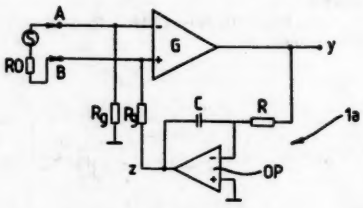
function of the gain as determined by the level of said composite RF signal and the level of the amplifier output, said feedback signal being increasingly attenuated with increasing gain.

4,999,584

SIGNAL-SHAPING NETWORK

Paavo Eskelinen, Oulu, Finland, assignor to Noraxon Oy, Oulu, Finland

PCT No. PCT/FI87/00158, § 371 Date Jul. 20, 1989, § 102(e) Date Jul. 20, 1989, PCT Pub. No. WO88/04114, PCT Pub. Date Jun. 2, 1988
PCT Filed Nov. 26, 1987, Ser. No. 364,425
Claims priority, application Finland, Nov. 28, 1986, 864857
Int. Cl.[5] H03F *1/34*
U.S. Cl. 330—107 **14 Claims**



1. A signal-shaping network comprising:

a differential amplifier having an output, an inverting and a non-inverting input;

means for providing a signal source coupled to said inverting and non-inverting inputs, said signal source not being referenced to a reference potential of said differential amplifier, a voltage differential of said signal source being applied across said inverting and non-inverting inputs; and

an integrating feedback circuit connected between said output and one of said inputs to said differential amplifier.

4,999,585

CIRCUIT TECHNIQUE FOR CANCELLING NON-LINEAR CAPACITOR-INDUCED HARMONIC DISTORTION

Rodney T. Burt; Timothy V. Kalthoff; David A. Heisley, and R. Mark Stitt, II, all of Tucson, Ariz., assignors to Burr-Brown Corporation, Tucson, Ariz.

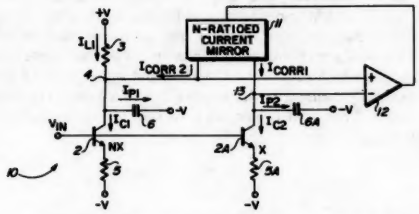
Filed Nov. 6, 1989, Ser. No. 432,544
Int. Cl.[5] H03F *1/32*
U.S. Cl. 332—149 **15 Claims**

14. A method for reducing effects of a first parasitic capaci-

tance of a first transistor in an amplifier, the method comprising the steps of:

(a) applying a small signal input voltage to a first conductor coupled to a control electrode of the first transistor and to a control electrode of a second transistor, the second transistor having a second parasitic capacitance;

(b) producing a first variation in a current-carrying electrode voltage of the first transistor and a second variation in a current-carrying electrode voltage of the second transistor in response to the input voltage, and producing a first parasitic current in the first parasitic capacitance in response to the first variation and a second parasitic current in the second parasitic capacitance in response to the second variation;



(c) causing the first parasitic current to flow in a second conductor connected to a current-carrying electrode of the first transistor;

(d) causing the second parasitic current to flow in a control conductor of a current mirror, and operating the current mirror to produce a correction current in an output conductor of the current mirror in response to the second parasitic current

(e) causing the correction current to also flow in the second conductor and thereby cancel at least a portion of the first parasitic current therein, thereby reducing the effects of the first parasitic capacitance.

4,999,586

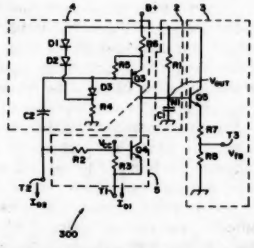
WIDEBAND CLASS AB CRT CATHODE DRIVER

Robert G. Meyer, Berkeley, and Jeffrey D. Scotten, Roseville, both of Calif., assignors to North American Philips Corp and Hewlett-Packard Co., New York, N.Y.

Filed May 26, 1988, Ser. No. 198,950

Int. Cl.[5] H03F *1/26;* H04N *5/14*

U.S. Cl. 330—288 **14 Claims**



1. A wideband amplifier comprising:

an input terminal for receiving an input signal to be amplified;

an output terminal for providing an output signal as a function of said input signal;

feedback means for providing a feedback signal in response to said output signal;

control signal means for receiving said input signal and said feedback signal and, in response thereto, providing one or more control signals;

an output stage for providing said output signal, said output stage including transient signal paths, each connected between said output terminal and an associated supply voltage, and each said transient signal path comprising a transistor driven in a manner which allows the bandwidth of said transient signal path to be substantially equal to the frequency F_t of unity current gain of said transistor.

4,999,587

WAVEGUIDE OSCILLATOR TUNABLE THROUGH INTEGRATED VARACTOR DIODE AND COUPLING PROBE

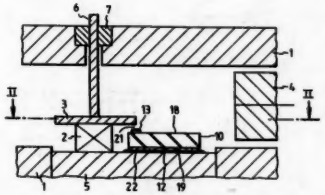
David H. Evans, Crawley, United Kingdom, assignor to U.S. Philips Corp., New York, N.Y.

Filed Jan. 3, 1990, Ser. No. 460,411

Claims priority, application United Kingdom, Jan. 20, 1989, 8901290

Int. Cl.[5] H03B *7/14, 9/14*

U.S. Cl. 331—107 DP **12 Claims**



1. A tunable waveguide oscillator comprising a negative-resistance oscillator device in a waveguide, and variable reactance means comprising a varactor diode coupled to the oscillator device to permit electronic tuning of the operating frequency of the oscillator, the oscillator device having a resonant cap for coupling to the waveguide, and the reactance means having an electric probe which is orientated so as to couple to the electromagnetic field in the vicinity of the cap, characterised in that the reactance means comprising both the varactor diode and the probe is integrated in a circuit body mounted in the waveguide, and in that the probe is formed by an electrically conductive track on the circuit body, which track is separated from the resonant cap by a gap inside the waveguide, at which gap the track is coupled to the electromagnetic field in the waveguide.

4,999,588

INTEGRATABLE AMPLITUDE-REGULATED OSCILLATOR CIRCUIT

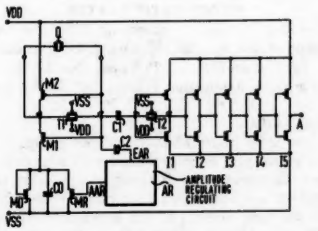
Rudolf Koch, Unterhaching, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Mar. 5, 1990, Ser. No. 488,692

Claims priority, application European Pat. Off., Mar. 3, 1989, 89103800.2

Int. Cl.[5] H03B *5/36;* H03L *5/00*

U.S. Cl. 331—109 **16 Claims**



16. Integratable amplitude-regulated oscillator circuit, comprising a resonator element, a control element, an inverter

connected to said resonator element and to said control element, an amplitude regulating circuit connected to said inverter and to said control element, and an output stage connected to said inverter, said amplitude regulating circuit including a differential amplifier and peak value rectifiers connected to said differential amplifier.

4,999,589

LOW PHASE NOISE VOLTAGE CONTROLLED OSCILLATOR

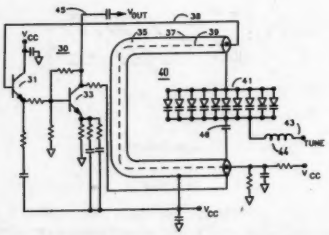
Marcus DaSilva, Spokane, Wash., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 212,849, Jun. 29, 1988, Pat. No. 4,939,481. This application Feb. 2, 1990, Ser. No. 473,772

The portion of the term of this patent subsequent to Jul. 3, 2007, has been disclaimed.

Int. Cl.[5] H03B *5/12, 5/18*

U.S. Cl. 331—117 R **13 Claims**



1. A voltage controlled oscillator comprising:

a pair of transistors forming an RF amplifier, said RF amplifier including means for limiting its output signal for maintaining a predetermined signal-to-noise ratio, said pair of transistors connected as a Darlington amplifier;

an LC resonant circuit including a capacitive element having a specified value and a length of coaxial cable forming an inductive element, the dimensions of said coaxial cable selected to provide a desired range of inductance such that said LC resonant circuit has a predetermined range of impedance in a predetermined frequency range, the value of RF voltage applied to said LC resonant circuit being less than a predetermined value;

first coupling means coupling an output of said RF amplifier to said LC resonant circuit;

second coupling means coupling a feedback signal from said LC resonant circuit to an input of said RF amplifier; and

bias means coupled to said LC resonant circuit for supplying a bias voltage to said capacitive element for tuning said LC resonant circuit to a desired frequency within said predetermined frequency range.

4,999,590

FOUR STATE PHASE SHIFT MODULATOR, IN PARTICULAR FOR AMPLITUDE MODULATION OF TWO CARRIERS IN QUADRATURE WITH A LARGE NUMBER OF STATES

Georges Verdot, 33, rue de l'aérodrome, 22300 Lannion, France

Continuation of Ser. No. 255,362, Oct. 7, 1988, abandoned. This application May 15, 1990, Ser. No. 523,842

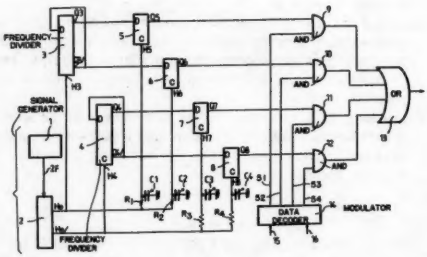
Claims priority, application France, Oct. 21, 1987, 87 14755

Int. Cl.[5] H04L *27/20, 27/36*

U.S. Cl. 332--104 **4 Claims**

1. A four state phase shift modulator comprising a high frequency signal generator provided with four outputs Q5 to Q8 generating signals with four different phases, each phase shifted by 90° respectively, a four input phase selector connected to the four outputs of the generator and having four modulating signal inputs and four phase shifted carrier outputs, the generator having a source of signals providing first and second outputs with opposing phases, two frequency dividers each having two outputs in opposing phases and each having a clock input, the clock input of the first divider being connected to the first output of the source of signals and the clock input of the second divider being connected to the second output of the source of signals, two pairs of flip-flops whose outputs make up the four outputs of the generator, the clock inputs of the first pair of flip-flops being connected to the first output of the source of signals and the clock inputs of the second pair of flip-flops being connected to the second output of the source of signals, the signal inputs of the first pair of flip-flops being connected to the outputs of the first divider and the signal inputs of the second pair of flip-flops being connected to the outputs of the second divider respectively, the four phase shifted carrier outputs being connected to the four inputs of an OR gate respectively, generating a QPSK modulation signal.

3. A 2^{2n} QAM modulator comprising a plurality (n) of QPSK modulators, n attenuators, and an adder; each of said QPSK modulators being coupled via one of said attenuators to said adder which produces a QAM output signal; each of said attenuators providing an attenuating coefficient $6(n-1)$, with n varying from 1 to n; and each of said QPSK modulators comprising:



a high frequency signal generator provided with four outputs Q5 to Q8 generating signals with four different phases, each phase being shifted by 90° respectively, a four input phase selector connected to the four outputs of the generator and having four modulating signal inputs and four phase shifted carrier outputs, the generator having a source of signals provided first and second outputs with opposing phases, two frequency dividers each having two outputs in opposing phases and each having a clock input, the clock input of the first divider being connected to the first output of the source of signals and the clock input of the second divider being connected to the second output of the source of signals, two pairs of flip-flops whose outputs make up the four outputs of the generator, the clock inputs of the first pair of flip-flops being connected to the first output of the source of signals and the clock inputs of the second pair of flip-flops being connected to the second output of the source of signals, the signal inputs of the first pair of flip-flops being connected to the outputs of the first divider and the signal inputs of the second pair of flip-flops being connected to the outputs of the second divider respectively, the four phase shifted carrier outputs being connected to the four inputs of an OR gate respectively, generating a QPSK modulation signal.

4,999,591

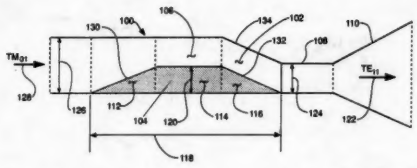
CIRCULAR TM_{01} TO TE_{11} WAVEGUIDE MODE CONVERTER

Robert A. Koslover; Charles D. Cremer, both of Albuquerque, N. Mex.; William P. Geren, Seattle, Wash.; Donald E. Voss, Cedar Crest, and Lynn M. Miner, Albuquerque, both of N. Mex., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 22, 1990, Ser. No. 491,379

Int. Cl.[5] H01P *1/16*

U.S. Cl. 333—21 R 20 Claims



1. Circular waveguide broadband microwave TM_{01} to TE_{11} mode converter apparatus comprising the combination of:

means including an axis centered right circular cylinder shaped first waveguide section of first circle physical diameter for receiving TM_{01} mode microwave energy from a source thereof;

means including a tapering bodied asymmetric conical frustum shaped second waveguide section of said first circle base diameter and axis centering, at a said first waveguide section connected input end thereof, and of a smaller second circle base diameter and base displacement from said axis centering at the load connected output end thereof, for converting input end received TM_{01} mode electromagnetic wave energy through an intermediate mode to output end issued TE_{11} mode electromagnetic wave energy.

4,999,592

CONVERTER FOR PLANAR ANTENNA

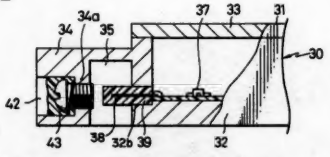
Minoru Kanda; Mikio Komatsu; Yasuhiro Fujii; Toshio Abiko; Kyoji Masamoto; Yasumasa Ogawa, and Tuyoshi Hashimoto, all of Osaka, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Nov. 13, 1989, Ser. No. 434,448

Claims priority, application Japan, Nov. 12, 1988, 63-286085; May 25, 1989, 1-131956; May 26, 1989, 1-134014; Jul. 26, 1989, 1-87641[U]

Int. Cl.[5] H01P *5/107*

U.S. Cl. 333—26 4 Claims



1. A frequency converter adapted to be disposed on a surface of a planar antenna, the converter comprising:

a converter body forming therein a first space which contains a circuit board, said circuit board carrying a circuit pattern, a flange positioned on a first wall of said converter body for defining an input part forming a waveguide structure, said input part forming therein a second space having an opening to the exterior, said input part including a second wall located opposite said first wall;

a probe for performing a microstrip-to-waveguide transformer, said probe oriented parallel to a plane of said circuit board and passing through an aperture in said first wall, a first end of said probe being connected to an input side of said circuit pattern on said circuit board, and a second end of said probe extending into said second space, a portion of said probe disposed within said aperture being entirely encased within a rod of dielectric material which engages a surface of said aperture to retain said probe within said first wall, said probe and said rod being formed as separate members relative to said circuit pattern and circuit board, respectively, and being spaced from said second wall; and

an electrically conductive adjusting screw mounted in said second wall in coaxial alignment with said probe, said screw being adjustable toward and away from said second end of said probe for causing the microstrip-to-waveguide transform characteristics to be varied.

4,999,593

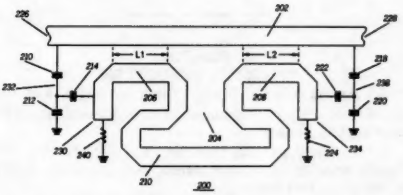
CAPACITIVELY COMPENSATED MICROSTRIP DIRECTIONAL COUPLER

Dale R. Anderson, Fort Worth, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jun. 2, 1989, Ser. No. 360,668

Int. Cl.[5] H01P *5/18*

U.S. Cl. 333—112 8 Claims



1. A directional coupler comprising:

a first transmission line having a first port and a second port;

a conductor electromagnetically coupled to the first line, said conductor having a third port and a fourth port;

a first reactive coupling network coupled between the first port and the third port, further comprising:

a first reactive element, having a first terminal and a second terminal, said first terminal being coupled to the first port;

a second reactive element, having a first terminal and a second terminal, said first terminal being coupled to the second terminal of the first reactive element at a first common node and said second terminal being coupled to ground potential;

a third reactive element, said third reactive element being disposed between the first common node and the third port.

4,999,594

AC LINE FILTER WITH TAPPED BALUN WINDING

Thomas M. Ingman, Somis, Calif., assignor to Condor, Inc., Oxnard, Calif.

Filed Dec. 9, 1988, Ser. No. 282,071

Int. Cl.[5] H03H *7/09*

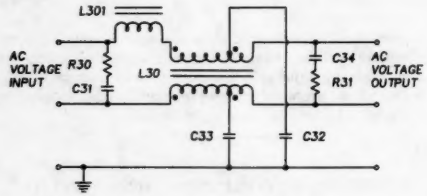
U.S. Cl. 333—181 31 Claims

1. An AC line filter connected to a ground and having an AC voltage input with a first line and a second line and an AC voltage output with a first line and a second line, comprising:

a balun having a first and a second set of windings would on a magnetic core for coupling said first set of windings to said second set of windings, with said first and second set of windings each having a first end and a second end, respectively, and each having a first and a second tap, respectively, the first end of said first set of windings coupled to the first line of the AC voltage input and the second end of said first set of windings coupled to the first line of the AC voltage output, the first end of said second set of windings coupled to the second line of the AC

voltage input and the second end of said second set of windings coupled to the second line of the AC voltage output;

first Y capacitance means connected between said ground and said first tap of said first set of windings of said balun,



for reducing electromagnetic interference due to common mode noise; and,

second Y capacitance means connected between said ground and said second tap of said second set of windings of said balun, for reducing electromagnetic interference due to common mode nose.

4,999,595

LC FILTER STRUCTURE

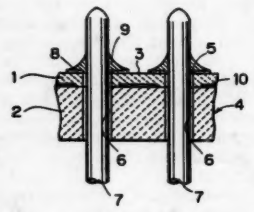
Takeshi Azumi; Hiroshi Morii; Yasuyuki Naito, and Yukio Sakabe, all of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Jan. 23, 1989, Ser. No. 300,422

Claims priority, application Japan, Jan. 22, 1988, 63-13274; May 30, 1988, 63-131985

Int. Cl.[5] H03H *7/00*

U.S. Cl. 333—184 **7 Claims**



1. An LC filter comprising:

a cofired ceramic laminate having at least one dielectric part, defining an exposed surface, and at least one magnetic part integrally sintered with said dielectric part in a layered manner, said ceramic laminate being provided with at least one through hole having a first opening positioned at said exposed surface of said dielectric part and commonly passing through both said dielectric part and said magnetic part;

through conductor means inserted in said through hole;

first capacitor electrode means provided on said exposed surface at a peripheral region of said first opening and electrically connected with said through conductor means;

second capacitor electrode means opposing said first capacitor electrode means through at least a part of a dielectric member forming said dielectric part, thereby to form electrostatic capacitance across said first and second capacitor electrode means; and

external ground electrode means being electrically connected to said second capacitor electrode means and formed on said ceramic laminate.

4,999,596

SECOND-HARMONIC-WAVE CHOCKING FILTER

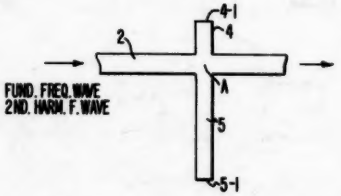
Tetsuji Nakatani, and Akira Watanabe, both of Nishi, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 28, 1989, Ser. No. 442,507

Claims priority, application Japan, Dec. 2, 1988, 63-306351

Int. Cl.[5] H01P *1/203*

U.S. Cl. 333—204 **10 Claims**



1. A second-harmonics choking filter of a strip-type transmission line, comprising:

a main transmission line through which an electromagnetic wave having a fundamental frequency is to be transmitted;

a first open stub having a length of substantially $Lg(2n+1)/8$, Lg denoting an effective wavelength of the fundamental frequency on said first open stub, numeral n denoting an integer greater than negative one, said first open stub being operatively connected to a side of said main transmission line; and

a second open stub having a length of substantially $Lg'(2m+3)/8$, Lg' denoting an effective wavelength of said fundamental frequency on said second open stub, numeral m being equal to said numeral n, said second open stub being operatively connected to said main transmission line vis-a-vis said first open stub,

whereby the fundamental frequency of the electromagnetic wave is transmitted through said main transmission line without being substantially attenuated and a second harmonic of the fundamental frequency of the electromagnetic wave is substantially choked to prevent propagation along said main transmission line.

4,999,597

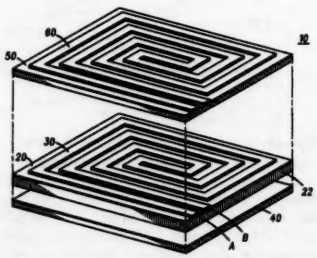
BIFILAR PLANAR INDUCTOR

Michael P. Gaynor, Oak Park, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 16, 1990, Ser. No. 481,002

Int. Cl.[5] H01P *1/00*; H01F *27/28*

U.S. Cl. 333—246 **8 Claims**



1. A substantially planar stripline inductor comprised of:

first dielectric substrate means for supporting conductive material, said dielectric substrate means being substantially planar with first and second sides and with at least one bounding edge;

a first continuous path of conductive material deposited onto

said first side of said first dielectric means, said path having at least first and second ends and having a bifilar pattern by which said at least first and second ends form connection nodes proximate to said bounding edge(.);

a first conductive plane deposited onto said second side of said substrate means;

a second dielectric substrate deposited onto said first substrate means, substantially covering said first continuous path; and

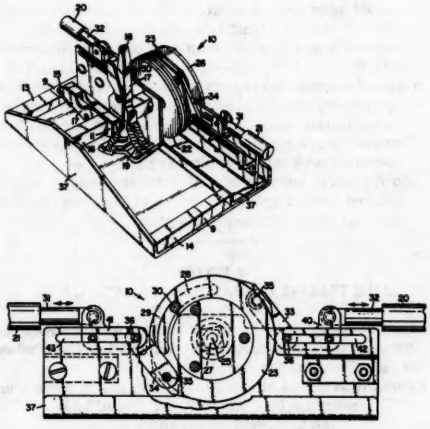
a second conductive plane deposited onto said second dielectric layer thereby forming a strip line inductor.

4,999,598

THREE-POSITION ACTUATING MECHANISM FOR TRANSFER SWITCH

Michael J. Jannesari, Spring Lake Park, and Alan N. Fabian, Roseville, both of Minn., assignors to Onan Corporation, Minneapolis, Minn.

Filed Jul. 18, 1989, Ser. No. 381,525
Int. Cl.[5] H01H *67/06, 3/00*
U.S. Cl. 335—122 **10 Claims**



8. A transfer switch for transferring an electrical load from a normal power source to an emergency power source, and vice versa, comprising:

(a) a rotatable cross bar which rigidly supports a plurality of movable contacts, said movable contacts being rotatable between a position contacting a normal power source stationary contact, a position contacting an emergency power source stationary contact, and an intermediate neutral position therebetween;

(b) a driven disk having a shaft which is interconnected to said rotatable cross bar, said driven disk having an eccentric pin, wherein rotation of said driven disk causes rotation of said cross bar;

(c) first and second rotatable drive disks in parallel relationship to each other and to said driven disk, each of said drive disks having an arcuate slot which slidably accommodates said pin; and

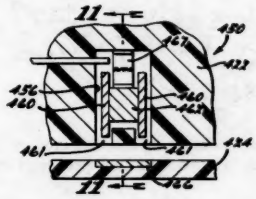
(d) a pair of solenoids having plungers which are pivotally interconnected by linkages to an eccentric point on each of said drive disks respectively, wherein actuation of a solenoid causes rotation of said drive disk interconnected thereto.

4,999,599

MAGNETIC SWITCH AND LATCH FOR VEHICLE ACCESSORIES

Eric A. Spier, Lake Orion, Mich., assignor to Irvin Automotive Products, Inc., Auburn Hills, Mich.

Filed Apr. 20, 1990, Ser. No. 512,733
Int. Cl.[5] H01H *9/00*
U.S. Cl. 335—207 **74 Claims**



1. A magnetic switch assembly for an electrical circuit, said switch comprising:

a switch housing having a cavity formed therein and at least one magnetically attractable electrical contact member exposed within said cavity;

an electrically-conductive pole member movably disposed within said cavity, said pole member having a magnet secured thereto for movement therewith, said pole member and said magnet being movable in said cavity between a first position wherein said pole member is in electrical contact with said contact member in order to complete electrical continuity of the electrical circuit and a second position wherein said pole member is spaced away from said contact member in order to break electrical continuity of the electrical circuit, the magnetic attraction between said magnet and said contact member tending to magnetically bias said pole member and said magnet into one of said first and second positions; and

a movable and magnetically attractable striker member disposed for movement toward and away from said cavity in said switch housing on an opposite side of said magnet from said contact member, the magnetic attraction between said magnet and said striker member being greater than the magnetic attraction between said magnet and said contact member in order to overcome said magnetic bias of said pole member and said magnet toward said one of said first and second positions and to move said pole member and magnet into the other of said first and second positions when said striker member is moved within a predetermined distance from said cavity.

4,999,600

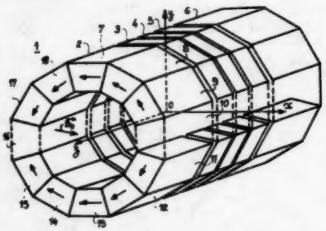
CYLINDRICAL PERMANENT MAGNET TO PRODUCE A TRANSVERSAL AND UNIFORM INDUCTION FIELD

Guy Aubert, Grenoble, France, assignor to Centre National de la Recherche Scientifique, Paris, France

PCT No. PCT/FR87/00392, § 371 Date Apr. 14, 1989, § 102(e) Date Apr. 14, 1989, PCT Pub. No. WO88/02923, PCT Pub. Date Apr. 21, 1988
PCT Filed Oct. 13, 1987, Ser. No. 353,674
Claims priority, application France, Oct. 17, 1986, 86 14417
Int. Cl.[5] H01F *7/02*
U.S. Cl. 335—306 **16 Claims**

1. Cylindrical permanent magnet (1) to produce a uniform and transversal (x) induction field (B_0), of the type comprising magnetized blocks (7–18) with a permanent magnetization, distributed in annular sections (2–6) arranged along the cylinder, and distributed on the rim of each section, characterized in

that the magnetization, in the blocks, is oriented at least partially tangentially in each block with respect to the cylinder



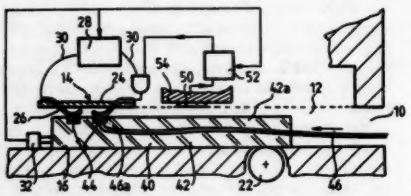
and in that the blocks are mounted on crowns (36) which are mobile (39, 40) to correct the homogeneity of the magnet.

4,999,601

MEMORY CARD READ/WRITE DEVICE PROVIDED WITH AN ANTI-FRAUD DEVICE

Michel Gervais, L'Hay les Roses, France, assignor to Schlumberger Industries, Montrouge, France

Filed Dec. 23, 1988, Ser. No. 289,136
Claims priority, application France, Dec. 28, 1987, 87 18227
Int. Cl.[5] G06K *19/06*
U.S. Cl. 235—492 9 Claims



1. A read/write device for electronic memory cards, the device comprising:

a processing circuit;

a card insertion slot;

a connection head including at least one contact element for electrically connecting the circuit of said card to said processing circuit when said card is in a processing position;

guide means for guiding said card between the insertion slot and the processing position; and

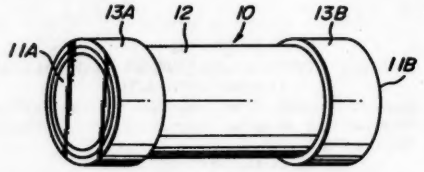
detector means for detecting an extraneous conductor wire inserted in said device, the detector means comprising a conductor element disposed substantially parallel to the direction of card insertion between said slot and said connection head in order to intercept any path between said slot and said connection head, and an electrical circuit established between at least one of the contact elements of said connection head and said conductor element, said electrical circuit comprising an A.C. signal generator, and a detector for detecting the appearance of an A.C. signal at a point in said circuit due to the effect of capacitive coupling between said conductor element and an extraneous conductor wire electrically connected to said connection element and extending past said plate.

4,999,602

RESISTOR FOR AUDIO/VIDEO SIGNAL CIRCUIT

Naotake Hayashi, Tokyo, Japan, assignor to Stax Industries Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 172,176, Mar. 23, 1988, which is a division of Ser. No. 776,052, Aug. 29, 1985, Pat. No. 4,741,041, and a continuation-in-part of Ser. No. 931,589, Oct. 27, 1986. This application Jul. 25, 1988, Ser. No. 223,326
Claims priority, application Japan, Dec. 29, 1983, 58-252058; Feb. 27, 1984, 60-36604
Int. Cl.[5] H01C *1/012*
U.S. Cl. 338—308 14 Claims



1. A resistor for audio/video signal circuit, which comprises:

a substrate consisting essentially of dielectric material, with a substantially cylindrical outer peripheral surface and a pair of end surfaces;

a resistive material layer arranged substantially exclusively on said outer peripheral surface of said substrate, whereby said end surfaces of said substrate are not covered by said resistive material layer, with said dielectric material of said substrate being exposed on said end surfaces; and

a pair of terminal end regions in electrical contact with said resistive material layer on said outer peripheral surface of said substrate, each of said terminal end regions being composed of a material with a relatively low resistivity as compared with said resistive material;

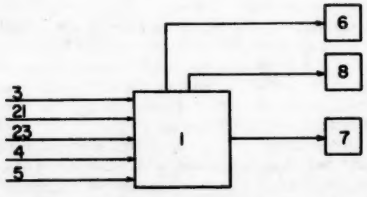
said dielectric material of said substrate being a member selected from a group consisting of ceramics, sapphire, diamond and amorphous silica glass.

4,999,603

MULTI-FUNCTIONAL BASKETBALL GAME MONITORING UNIT

Thomas C. Mele; Mary K. Mele, both of 4804 Palisade Dr.; Robert C. Dyer, and Margaret A. Dyer, both of 4806 Palisade Dr., all of Austin, Tex. 78731

Continuation-in-part of Ser. No. 293,703, Jan. 5, 1989. This application Nov. 13, 1989, Ser. No. 435,036
Int. Cl.[5] A63B *63/00;* G08B *23/00*
U.S. Cl. 340—323 R 10 Claims



1. A multifunctional basketball game monitoring unit comprising:

(a) a scoring sensor means to sense passage of a basketball through a hoop on a backboard;

(b) a power source to power said scoring sensor means and communication means from said scoring sensor means to a controller means;

(c) an impact sensor means to determine when a basketball impact said backboard and to transmit data to said controller means;

(d) laser beam generator means and laser beam receiver means to form a laser beam grid over a playing surface between two of said backboard with beams of said laser beams grid being closer together than a diameter of said basketball;

said laser beam receiver means communicating with said controller means to allow determination of coordinates of a point where said basketball passes through said laser grid;

(e) an output from said controller means to a visual display unit.

4,999,604

TIMING SYSTEM

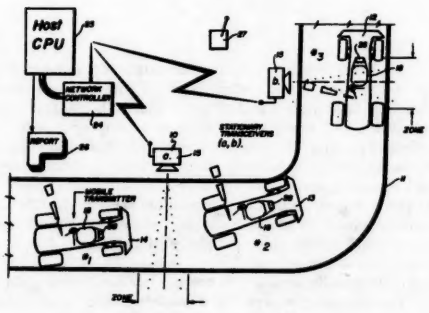
Eric J. Crews, 9 Sycamore St., Millbury, Mass. 01527

Continuation-in-part of Ser. No. 161,005, Feb. 26, 1988, Pat. No. 4,857,886. This application Jul. 27, 1989, Ser. No. 386,571

The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.

Int. Cl.[5] G08B *23/00*

U.S. Cl. 340—323 R **4 Claims**



1. Timing system for use with a predetermined traffic course along which a plurality of vehicles travel in random sequence, comprising:

(a) a stationary transceiver located at each of a plurality of selected locations along the course, each transceiver having a receiver portion with a short range, narrow receiving pattern directed across the course and having a transmitter portion with a relatively long range, broad transmitting pattern, and

(b) a mobile transmitter located on each vehicle and transmitting a coded transmission distinctive of that vehicle of short time duration, the transmitter having a short range, broad pattern of transmission, and

(c) a network controller located in the vicinity of the course and receiving transmissions from the transmitter portion of all the transceivers, whereby the controller receives all information of the time of arrival of each vehicle at each transceiver, irrespective of coincidental arrival of more than one vehicle at a given transceiver, wherein a main computer is provided to receive information from the network controller relative to all transceivers and all vehicles to generate reports on the individual vehicles, and wherein a plurality of mobile transceivers are provided to receive coded information from the network controller, each mobile transceiver displaying only information on a selected vehicle by virtue of the coding of the information.

4,999,605

Patent Not Issued For This Number

4,999,606

DIVE PARAMETER INDICATING ASSEMBLY

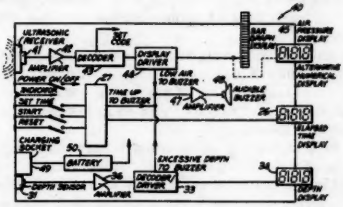
Ernest Comerford, 41 Moresby Street, Trinity Beach, Queensland 4871, and Michael Adamek, Magnetic Island, both of Australia, assignors to Ernest Comerford, Queensland, Australia

Continuation of Ser. No. 283,993, Dec. 22, 1988, Pat. No. 4,949,072. This application Jun. 25, 1990, Ser. No. 543,476

Claims priority, application Australia, Mar. 3, 1987, PI0633

Int. Cl.[5] G08B *25/00*; H04B *11/00*

U.S. Cl. 340—525 **29 Claims**



1. An underwater transmitter/receiver assembly for use with a self-contained underwater breathing apparatus including a breathing gas tank and a diver's face mask, the assembly comprising:

transmitting circuit means attachable to said tank and includ-

ing sensor means for providing output signals indicative of variable actual dive parameters, a modulator modulating said output signals, and a transmitting circuit propagating a modulated carrier wave representative of a respective one of said output signals;

means providing information on variable dive parameters to an individual diver wearing said face mask, said information providing means being attachable to the diver and including a receiver circuit which is physically disconnected from said transmitting circuit means and receives therefrom said modulated carrier wave, and a demodulator for demodulating said carrier wave; and

a display device providing to the diver a visual display indicative of a respective variable dive parameter.

4,999,607

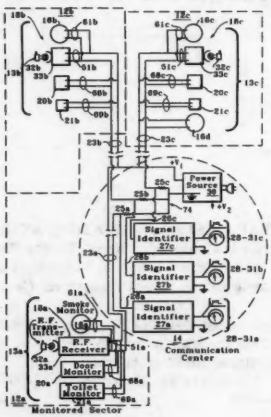
MONITORING SYSTEM WITH IMPROVED ALERTING AND LOCATING

Wayne W. Evans, Roswell, Ga., assignor to Biotronics Enterprises, Inc., Norcross, Ga.

Continuation of Ser. No. 129,158, Dec. 7, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 322,616

Int. Cl.[5] G08B *1/08*

U.S. Cl. 340—533 **14 Claims**



1. A multi-condition monitoring system, comprising:

a plurality of indicator means for indicating the occurrence of multiple conditions, wherein each indicator means of said plurality of indicator means indicates the occurrence of at least one condition of said multiple conditions; each said indicator means changing from a non-triggered status to a triggered status upon occurrence of the respective condition;

a plurality of monitoring means for monitoring the status of said plurality of indicator means, wherein each monitoring means of said plurality of monitoring means monitors the status of at least one indicator means of said plurality of indicator means;

each said monitoring means comprising, at least, a detecting means for detecting said triggered status of the respective said indicator means, and a signal means for developing an identifying signal in direct response to detection of said triggered status by said detecting means;

each said monitoring means of said plurality of monitoring means requiring electric power for operation;

signal conditioning means for acting upon said identifying signal of each said monitoring means of said plurality of monitoring means to generate usable output;

power means for supplying operating power for each said monitoring means of said plurality of monitoring means;

a two conductor bus connecting said plurality of monitoring means to said power means and to said signal conditioning means, said two conductor bus carrying said identifying signals from all monitoring means of said plurality of monitoring means to said signal conditioning means and carrying said operating power from said power supply means to all said monitoring means of said plurality of monitoring means; and

each said monitoring means being connected to said bus in series electrical relationship with said power means and said signal conditioning means and being connected to said bus in parallel electrical relationship with each of the other said monitoring means of said plurality of monitoring means.

4,999,608

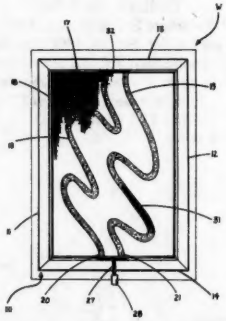
SCREEN FOR BURGLAR ALARMS AND METHOD OF MAKING THE SAME

David E. Galomb, P.O. Box A, Trexlertown, Pa. 18087

Filed Jul. 19, 1989, Ser. No. 381,961

Int. Cl.[5] G08B *13/02, 13/08*

U.S. Cl. 340—550 **24 Claims**



1. In an electrically conductive security screen apparatus for use in a window frame and cooperating with a closed-circuit intrusion alarm system including an electrical-resistance-sensing means and alarm means to detect tampering with the screening material of a window screen apparatus, said window screen apparatus including a frame defining a window aperture, screening material comprising a non-conductive mesh of interwoven strands covering the window aperture, and flexible retaining means for securing the outer periphery of the screening material to the inner periphery of the screen frame, an improvement comprising;

An electrically conductive coating composition applied to the screening material in a predetermined non-overlapping pattern of electrical continuity, the pattern having a first end and a second end, such that a closed-circuit loop is formed when it is connected in series to said electrical-resistance-sensing means, the pattern having an electrical resistance that varies if it si distorted or its path interrupted.

4,999,609

ANTIPILFERAGE TAGS HAVING AN ACOUSTIC RESONATOR CHAMBER

Michael D. Crossfield, Burton End, England, assignor to Scientific Generics Limited, Cambridge, United Kingdom

Filed Apr. 27, 1989, Ser. No. 343,610

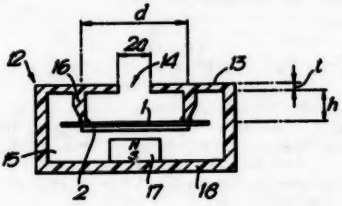
Claims priority, application United Kingdom, Apr. 29, 1988, 8810178

Int. Cl.[5] G08B *13/18*

U.S. Cl. 340—551 **11 Claims**

1. A tag for use in an antipilferage system, which is chartac-

terised in that the tag comprises an acoustic resonator chamber that is tuned to resonate an audible frequency which includes a



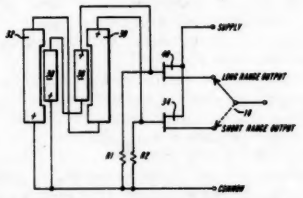
membrane formed of or including a layer of magnetostrictive material that is arranged to resonate at said audible frequency.

4,999,610

MULTI-RANGE INFRARED DETECTOR

John K. Guscott, Stow, Mass., assignor to Aritech Corporation, Framingham, Mass.

Filed Nov. 27, 1989, Ser. No. 441,173
Int. Cl.[5] G08B *13/18*
U.S. Cl. 340—567 **6 Claims**



1. A multi-range passive infrared intrusion detection system comprising:

a detector having a first detector element of a first size and a second detector element of a second size different from the first size;

the detector elements being operative to produce electrical signals in response to infrared energy impinging thereon;

an optical assembly for focusing infrared energy onto the detector elements;

a signal processor operative in response to electrical signals from the detector to provide an output indication of intruder detection; and

electrical selection means coupled to the first and second elements of the detector and operative to selectively connect either of the first and second elements to the signal processor to thereby change the operative range of the system.

4,999,611

TOWEL CABINET REPLENISHMENT INDICATION AND IDENTIFICATION SYSTEM

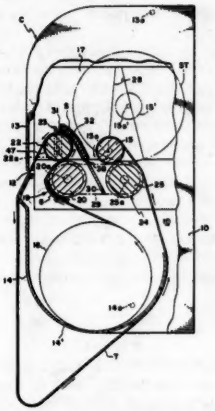
William Zehnder, Jr., 713 S. Main St., Frankenmuth, Mich. 48734

Continuation of Ser. No. 789,407, Oct. 21, 1983, Pat. No. 4,746,907. This application Mar. 4, 1988, Ser. No. 164,186
The portion of the term of this patent subsequent to May 24, 2005, has been disclaimed.
Int. Cl.[5] G08B *13/14*
U.S. Cl. 340—568 **9 Claims**

1. A method of indicating which of a plurality of widely dispersed towel cabinets in a building have their clean toweling web completely soiled and require clean towel roll replacement, the cabinets each having a used toweling wind-up roller system within each cabinet for rewinding the soiled web therein, and a clean toweling supply roller system mounted within each of said cabinets for web unwinding, rotary travel, the supply roller system in each cabinet including an axially extending, electrically non-conductive roller and a second axially extending member normally separated from the roller by the web, comprising the steps of:

a. mounting an electrically conductive strip on the peripheral face of the roller curved to the configuration of the face;

b. mounting an electrically conductive strip on the said second member in confronting relation with the strip on said roller and adapted to electrically engage with the



strip on the said roller when the terminal end of the towel web is withdrawn from between the roller and member; and

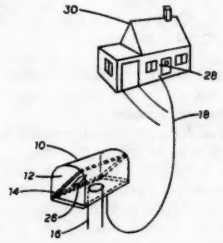
c. electrically connecting the respective strips in each cabinet with a separately identified indicator such that the indicator is energized by the electrical engagement of the respective strips in a given cabinet when a given towel web terminal end is withdrawn from between them and a particular cabinet is identified for replenishment of the toweling supply.

4,999,612

GRAVITY FED REMOTE MAIL DELIVERY INDICATOR

Albert G. Cherveny, 18655 Willow Ave., Country Club Hills, Ill. 60478

Filed Jun. 21, 1990, Ser. No. 541,376
Int. Cl.[5] G08B *13/14*
U.S. Cl. 340—569 **1 Claim**



1. A remote mail delivery indicator device, comprising:

(a) a photodiode emitter;

(b) a photo detector;

(c) an amplifying means;

(d) a voltage source;

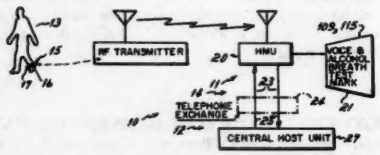
(e) a current sensor;
(f) a house/mailbox connecting wire;
(g) a bypass resistor;
(h) a mailbox having front, rear, side and bottom walls;
(i) a panel supported by said side and bottom walls and extending between said front and rear walls of said mailbox, with a groove extending longitudinally along said panel of sufficient width and depth to accommodate a light beam from said photodiode emitter and with the lateral center of said groove located a distance from one side of said panel of less than about 80 millimeters;
(j) said panel being mounted in said mailbox with slope of approximately one with said groove on the top side of said panel and said one side positioned along said bottom wall of said mailbox;
(k) said side wall which is positioned adjacent said one side being tilted from vertical in the direction of the panel;
(l) said photodiode emitter and said photo detector being mounted at longitudinally opposite ends of said groove so that maximum emission and detection sensitivity occur in the plane of said top side of said panel;
(m) mailbox end electronic circuitry comprising said photodiode emitter, said photo detector, said amplifying means, and said bypass resistor;
(n) house end electronic circuitry comprising said voltage source and said current sensor; and
(o) said house/mailbox connecting wire uniting said mailbox end electronic circuitry and said house end electronic circuitry.

4,999,613

REMOTE CONFINEMENT SYSTEM

Lon A. Williamson, Westchester; Frank C. Pennypacker, Loveland, both of Ohio; Donald W. Collier, Chicago, Ill., and Kip L. Fuller, Denver, Colo., assignors to Guardian Technologies, Inc., Cincinnati, Ohio

Continuation-in-part of Ser. No. 41,698, Apr. 21, 1987, Pat. No. 4,843,377. This application Apr. 26, 1989, Ser. No. 343,860
Int. Cl.[5] G08P *23/00;* **A61B** *5/08;* **H04M** *11/04*
U.S. Cl. 340—573 **43 Claims**



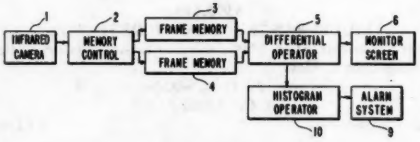
1. A remote confinement system for monitoring from a central office the presence of a specified prisoner at a remote confinement location at which the specified prisoner is assigned for unsupervised confinement, said system comprising:
a transmitter having attached thereto means for securing said transmitter to the body of the specified prisoner, said transmitter including means for transmitting a signal carrying characteristic information of the identity of said transmitter;
a receiver at said remote location for receiving said signal from said transmitter when said prisoner is within proximity to said remote location;
a processor at said remote location including a storage device for storing a transmitter ID code;
said processor including means for accepting transmitter identity information from said received signal, means for comparing said received information with a transmitter ID code stored in said storage device, and means for generating an output signal carrying the result of the comparison;
means for establishing a communications link between said remote location and said central office;
means for communicating from said central office to said remote location the transmitter ID code corresponding to the characteristic information of the identity of said transmitter; and
said processor including means for storing said assigned ID code in said storage device.

4,999,614

MONITORING SYSTEM USING INFRARED IMAGE PROCESSING

Ryuichi Ueda; Masaaki Nakamura; Toshio Iwasaki; Kanji Hirota, all of Kanagawa, and Tetsuya Nakamura, Tokyo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 28, 1988, Ser. No. 276,669
Claims priority, application Japan, Nov. 26, 1987, 62-299451; May 13, 1988, 63-117580
Int. Cl.[5] G08B *17/00*
U.S. Cl. 340—588 **25 Claims**



1. A temperature monitoring system, comprising:
at least one infrared camera for outputting temperature data of an object scene, the temperature data corresponding to a frame of picture elements;
a pair of frame memories arranged in parallel, each storing the temperature data, the temperature data including one of current temperature data in a current frame and previous temperature data in a previous frame;
memory control means, operatively connected to said infrared camera and said frame memories, for receiving the temperature data from said infrared camera and delivering the temperature data of each frame alternately to one of said frame memories;
a differential operator, operatively connected to said frame memories, for comparing the temperature data of each picture element of the current frame with the temperature data of corresponding picture elements of the previous frame and outputting differences therebetween as temperature difference signals; and
histogram operator means, operatively connected to said differential operator, for counting the picture elements having temperature difference signals within each of a plurality of predetermined temperature segments to produce a plurality of segment counts and for issuing a trigger signal in dependence upon at least one of the segment counts and at least one predetermined threshold condition.

4,999,615

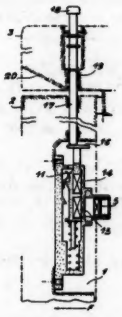
DEVICE FOR DETECTING THE EXCEEDING OF A TEMPERATURE THRESHOLD

Joseph F. Toupin, 28 rue du Pré72300 Sable sur Sarthe, and Xavier Douesnel, 10/16 rue Pierre Guérin, 75016 Paris, both of France

Filed Apr. 3, 1990, Ser. No. 503,738
Claims priority, application France, Apr. 3, 1989, 89 04374
Int. Cl.[5] G08B *17/02;* **G01D** *5/12*
U.S. Cl. 340—590 **20 Claims**

1. Device for detecting the clearing of a temperature threshold, incorporating a first part which can move within a sealed chamber containing a material which melts at the temperature of the threshold and a second part able to exert on said first part a magnetic force, at least when said first part is in a first position, so that a melting of said material leads to the displacement of said first part towards a second position, the displacement of said first part during the melting of the material leads

to a correlative displacement of said second part from a third to a fourth position, said latter displacement bringing about the



operation of alarm means, and said second part, in said fourth position, exerting on said first part a magnetic force bringing said first part into said first position.

4,999,616

DEVICE AND METHOD FOR RECOGNIZING THE INSTANTANEOUS POSITION OF MECHANICAL PARTS DRIVEN BY A STEPPING MOTOR

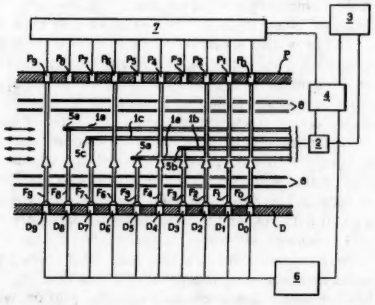
Claude Martin, rue Voltaire, and Francis Chevillon, rue Saint-Vincent-de-Paul, both of France, assignors to SECAP, Boulogne, France

Filed Mar. 30, 1990, Ser. No. 502,227

Claims priority, application France, Mar. 30, 1989, 89 04140

Int. Cl.[5] G08B *21/00*

U.S. Cl. 340—674 **9 Claims**



1. A device for recognizing the instantaneous position of a plurality of mechanical parts, the parts being capable of being linearly and incrementally displaced between a departure position and an arrival position, comprising:

(a) a plurality of radiation modifying tags respectively associated with said parts, said tags being movable to a plurality of tag positions corresponding to the incremental parts positions;

(b) a plurality of pairs of radiation emitting means and radiation receiving means, said pairs of means being located at incremental parts positions, an emitting means of each said pair being on one side of a position and a receiving means of said pair being on another side of said position, whereby the presence of a tag between one of said pairs of emitting and radiation receiving means causes a modification of radiation detectable by an associated receiving means;

(c) means for providing detect signals from said receiving means; and

(d) means for recognizing that corroborating detect signals provided by said receiving means correspond to a specific set of positions of said parts.

4,999,617

DEVICE FOR READING PATTERNS DISPLAYED ON A DISPLAY UNIT

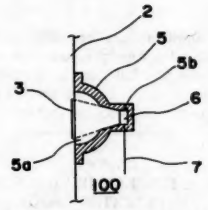
Susumu Uemura, Kyoto; Tadashi Tomino, Yamatokoriyama; Hiroshi Tsujioka, Nara; Shigeo Yoneda, Yamatokoriyama; Shigeru Shindoh, Yamatokoriyama, and Yasuhumi Yatsuzuka, Yamatokoriyama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 922,939, Oct. 24, 1986, abandoned. This application Dec. 19, 1988, Ser. No. 287,542

Claims priority, application Japan, Oct. 24, 1985, 60-240164; Oct. 25, 1985, 60-239671; Oct. 25, 1985, 60-239672; Oct. 25, 1985, 60-164652[U]; Oct. 25, 1985, 60-164653[U]; Oct. 29, 1985, 60-244815; Oct. 29, 1985, 60-244816; Nov. 21, 1985, 60-263273; Dec. 23, 1985, 60-294971; Dec. 23, 1985, 60-294973

Int. Cl.[5] H04N *7/00*

U.S. Cl. 340—706 **18 Claims**



1. A device for reading coded information patterns displayed on a display unit and outputting information signals corresponding to said coded patterns, comprising:

a substantially semi-spherical suction cup with a wide end and a narrow end, for attaching to a display surface of said display unit; and

photosensor means, integrally mounted within the narrow end of said substantially semi-spherical suction cup, for reading said coded information patterns,

said coded information patterns being bar code patterns utilized by a viewer.

4,999,618

DRIVING METHOD OF THIN FILM EL DISPLAY UNIT AND DRIVING CIRCUIT THEREOF

Shuji Inada; Toshihiro Ohba; Hiroshi Kishishita, all of Nara, and Hisashi Uede, Wakayama, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 17, 1988, Ser. No. 208,045

Claims priority, application Japan, Jun. 17, 1987, 62-150958

Int. Cl.[5] G09G *3/30*

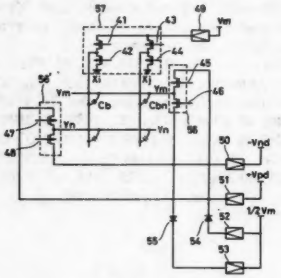
U.S. Cl. 340—781 **16 Claims**

14. A driving system for driving a display device in a first and second field with a write pulse of a positive and negative polarity in each of the first and second field, respectively, the display device including a plurality of data electrodes arranged in a first direction, a plurality of scan electrodes arranged so as to intersect the data electrodes in a second direction perpendicular to the first direction, picture elements formed at the data and scan electrodes intersection, and an EL layer sandwiched between the plurality of scan and data electrodes, the system comprising:

first modulating means, operatively connected to the data electrodes, for applying a first modulation voltage to data electrodes corresponding to selected picture elements during precharge of the second field and corresponding to non-selected picture elements during precharge of the first field;

second modulating means, operatively connected to the scan

electrodes, for applying a second modulation voltage to the scan electrodes, different from the first modulation voltage, to maintain a minimum voltage potential during precharge of the first field and to maintain a maximum voltage potential during precharge of the second field to therefore minimize relative power consumption necessary for lighting selected picture elements; and



write voltage supply means, operatively connected to the scan electrodes, for supplying the positive polarity write pulse during the first field and for supplying the negative polarity write pulse during the second field to the scan electrodes to light the selected picture elements.

4,999,619

ELECTRO-OPTIC DISPLAY DEVICE FOR USE IN THE REFLECTION MODE

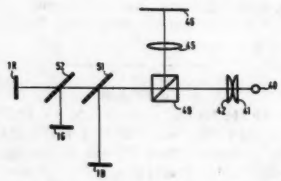
Ties S. Te Velde, Waalre, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 8, 1988, Ser. No. 204,145

Claims priority, application Netherlands, Jun. 10, 1987, 8701347; May 4, 1988, 8801164

Int. Cl.[5] G09G *3/36*

U.S. Cl. 340—784 **25 Claims**



1. A display device for use in reflecting an incident beam for display purposes, comprising a layer of liquid crystalline material between a first transparent supporting plate having at least one transparent first control electrode and a second supporting plate spaced by means of spacers from the first supporting plate and comprising at least one semiconductor body having one or more switching elements for driving a picture element matrix arranged in rows and columns and having picture electrodes which can be electrically driven separately, said picture electrodes substantially completely covering the semiconductor body at least at the area of the switching elements, the layer of liquid crystalline material being switchable between two states via electric voltages on the picture electrodes, said device, dependent on the applied electric voltage, traversing a range of continuously decreasing or increasing values of the reflection between a first state in which the molecules of the liquid crystal material have a first direction of orientation and a second state in which the molecules of the liquid crystal have a second direction of orientation substantially perpendicular to the first direction of orientation, characterized in that the difference in the effective optical path length, 2 dΔn, between the two states after reflection is substantially $\frac{1}{4}\lambda_0$ for an incident light beam having a central wavelength λ_0, where d is the thickness of the liquid crystal layer and Δn is the birefringence of the liquid material, while a maximum quantity of light is reflected in one of the two states, whereas a minimum quantity of light is reflected in the other state, and the thickness d is at most 2 μm.

4,999,620

APPARATUS FOR STORING AND ACCESSING IMAGE DATA TO BE DISPLAYED ON A DISPLAY UNIT

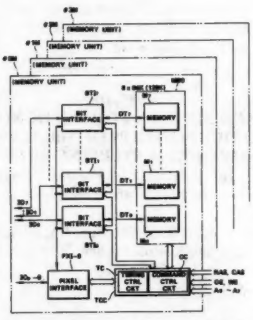
Takatoshi Ishii, Tokyo, Japan, assignor to ASCII Corporation, Tokyo, Japan

Filed Aug. 17, 1987, Ser. No. 86,680

Claims priority, application Japan, Aug. 21, 1986, 61-195899; Aug. 21, 1986, 61-195900; Aug. 21, 1986, 61-195901; Aug. 21, 1986, 61-195902; Aug. 21, 1986, 61-195903; Aug. 21, 1986, 61-195904

Int. Cl.[5] G09G *1/02*

U.S. Cl. 340—799 **9 Claims**



1. A single memory storage and accessing device for storing a plurality of image data corresponding to dots on a display screen, and providing access data to said memory storage and accessing device for accessing said image data stored therein, said single memory storage and accessing device comprising;

(a) memory means including a plurality of memory units, with a common address bus being connected in common to each said memory unit, each said memory unit having at least a first data port for a word data access and a second data port for a pixel data access, said first data port of each said memory unit being connected in common by a word data bus, and each said second data port of each said memory unit being independently connected to a respective pixel data bus, said pixel data buses and said word data bus being independently operable;

(b) select means for selecting a specific portion within a storage area of each said memory unit and enabling said selected specific portion so that said selected specific portion can be accessed within one memory cycle; and

(c) access data selecting means for selecting access data to be provided to each said memory unit so as to access said selected specific portion sequentially or randomly within one memory cycle.

4,999,621

TONE CODE IDENTIFICATION SYSTEM

Warner Loeb, Port Jefferson, N.Y., assignor to IDX Technologies, Inc., E. Setauket, N.Y.

Filed Jul. 27, 1989, Ser. No. 385,426

Int. Cl.[5] G06F *3/00*; H04M *3/00*

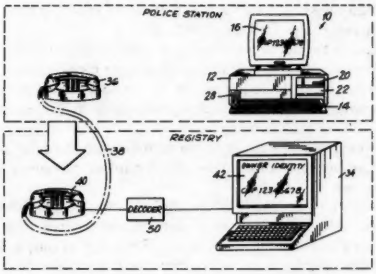
U.S. Cl. 340—825.34 **13 Claims**

1. An identification system for identifying registered owners of activatable, portable articles of personal property of the type having a sound emitter, said system comprising:

(a) means for incorporating unique identification codes with

the articles, each code being a different combination of symbols indicative of a registered owner of a respective article; and

(b) audible tone means for energizing each sound emitter to emit a unique plurality of audible tones upon activation of



the respective article, each audible tone corresponding to a respective symbol of the corresponding code incorporated with the respective article, the emission of the audible tones serving as an auditory notification that the respective article has a registered owner.

4,999,622

REMOTE COMMANDER HAVING A ROM READ-OUT PRE-PROGRAMMED CODES THEREFROM

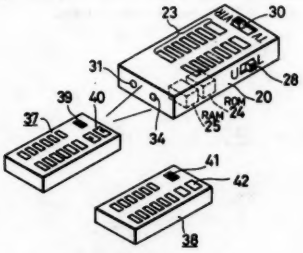
Toshio Amano, Kanagawa, and Akiko Shimada, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed May 22, 1989, Ser. No. 354,874

Claims priority, application Japan, Jun. 28, 1988, 63-159936

Int. Cl.[5] H04B *10/00*

U.S. Cl. 340—825.720 **4 Claims**



1. A multi-commander comprising:

a read only memory having stored therein in advance of the time of manufacturer of the multi-commander a plurality of remote control signals having different signal formats and including a manufacturer's code for each of a plurality of manufacturers;

remote control signal receiving means for receiving a remote control signal from an other remote commander, said remote control signal including a manufacturer's code identifying the manufacturer of said other remote commander;

a random access memory;

remote control signal transmitting means for transmitting a remote control signal from said read only memory; and

mode switch means for selectively switching between a setting mode and a remote control mode;

wherein, when said mode switch means is in the setting mode, the manufacturer's code included in the remote control signal derived from said other remote commander and received by said remote control signal receiving means is written in said random access memory and compared with said manufacturer's codes for each of the plurality of manufacturer's stored in said read only memory for identifying the manufacturer, so that the signal format of said remote control signal from the other remote commander is read out of said read only memory and is written in said random access memory; and

wherein, when said mode switch means is in the remote control mode, the signal format written in the random access memory is employed to select appropriate remote control signals from said read only memory for transmission by said signal transmitting means.

4,999,623

POSITION MEASURING APPARATUS WITH REFERENCE MARKS

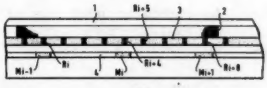
Alfred Affa, Stein/Traun, Fed. Rep. of Germany, assignor to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany

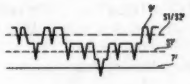
Filed May 2, 1990, Ser. No. 517,942

Claims priority, application Fed. Rep. of Germany, May 5, 1989, 3914739

Int. Cl.[5] H03M *1/22, 1/30*

U.S. Cl. 341—13 **15 Claims**





1. In a position measuring apparatus of the type that includes a measuring scale having a measuring graduation track and a reference mark track having a plurality of reference marks which can be selectably designated as marked or unmarked associated therewith and a scanning unit having a means for scanning and evaluating the tracks on the measuring scale, an improvement comprising:

an operating switch associated with the scanning unit, said operating switch capable of providing selection of one of at least two modes of operation of the scanning unit, the at least two modes including:

a first mode in which all the reference marks on the reference mark track are evaluated and

a second mode in which marked or unmarked reference marks on said reference track are evaluated.

4,999,624

HIGH SPEED HIGH RESOLUTION ANALOG/DIGITAL CONVERTER CIRCUIT

Herbert Pichlik, Altdorf Bei Nurnberg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 13, 1989, Ser. No. 366,105

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1988, 3820174

Int. Cl.[5] H03M *1/06*

U.S. Cl. 341—118 **14 Claims**

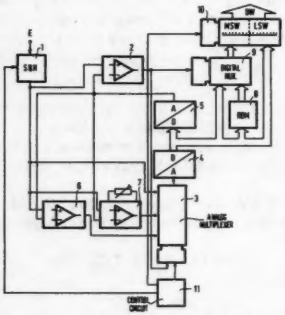
1. A circuit arrangement for analog/digital conversion comprising:

an analog input for receiving an analog signal,

an analog subtracter comprising first and second differential amplifiers and an analog multiplexer, means for coupling first inputs of the first and second differential amplifiers

and the analog multiplexer to said analog input and for coupling outputs of said first and second differential amplifiers to respective second and third inputs of the analog multiplexer,

an analog/digital converter coupled to an output of the analog multiplexer,



a digital/analog converter having an input coupled to an output of the analog/digital converter and an output coupled to second inputs of the first and second differential amplifiers,

a control device having an output coupled to a control input of the analog multiplexer, and

a device for error correction coupled to the output of the analog/digital converter.

4,999,625

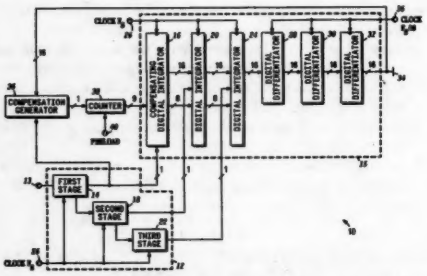
GENERATION OF A DIGITAL CORRECTION SIGNAL TO COMPENSATE FOR GAIN MISMATCHES IN A SIGMA DELTA MODULATOR

Charles D. Thompson, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 2, 1990, Ser. No. 487,337

Int. Cl.[5] H03M *1/06*

U.S. Cl. 341—118 **15 Claims**



1. A method of generating a digital correction signal which when applied to a digital integrator formed within a filter compensates for gain mismatches between the stages of a sigma delta modulator to provide improved resolution in the digital output signal of an oversampling analog-to-digital converter, comprising the steps of:

initializing the digital correction signal to a predetermined value;

applying an input signal to the sigma delta modulator;

comparing the current state of a first digital output signal provided at the output of one stage of the sigma delta modulator with the previous state of said first digital output signal;

activating a detection signal upon occurrence of two consecutive states of said first digital output signal of the same level wherein the occurrence of the two consecutive states of the same level corresponds to a noise spike in the digital output signal;

delaying said detection signal by a first predetermined number of sample clock cycles equal to the group delay of the filter allowing time for said first digital signal to propagate therethrough to the output bus;

sampling the digital output signal following the delay of said first predetermined number of sample clock cycles;

delaying said detection signal by a second predetermined number of sample clock cycles equal to the maximum width of said noise spike;

sampling the digital output signal following the delay of said first and second predetermined number of sample clock cycles;

comparing the sample of the digital output signal following the delay of said first predetermined number of sample clock cycles with the sample of the digital output signal following the delay of said first and second predetermined number of sample clock cycles; and

adjusting the value of said digital correction signal until the comparison of the sample of the digital output signal following the delay of said first predetermined number of sample clock cycles and the sample of the digital output signal following the delay of said first and second predetermined number of sample clock cycles reaches a predetermined minimum value.

4,999,626

APPARATUS HAVING A MODULAR DECIMATION ARCHITECTURE

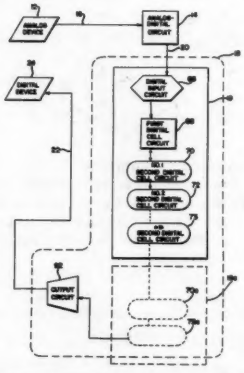
Safdar M. Asghar, and John G. Bartkowiak, both of Austin, Tex., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Oct. 30, 1989, Ser. No. 428,628

The portion of the term of this patent subsequent to Feb. 19, 2008, has been disclaimed.

Int. Cl.[5] H03M *7/00*

U.S. Cl. 341—126 **13 Claims**



1. An apparatus adaptable for use with an analog-digital conversion device for effecting communications from an analog device to a digital device, said analog-digital conversion device being operatively connected to said analog device and to the apparatus and converting incoming analog signals received from said analog device into incoming digital signals representative of said incoming analog signals, the apparatus comprising:

a decimator means for decimating incoming digital signals provided by said analog-digital conversion device and

providing decimated incoming digital signals representative of said incoming digital signals to said digital device;

said decimator means comprising a first decimator module, and an output means for providing digital outputs from said decimator means, said first decimator module comprising a digital input circuit, a first digital cell circuit, and a second digital cell circuit;

said digital input circuit receiving said incoming digital signal from said analog-digital conversion device and producing an incoming clocked input to said first digital cell circuit;

said first digital cell circuit producing a first iteration decimated digital signal to said second digital cell circuit in response to reception of said incoming clocked digital signal;

said second digital cell circuit producing a second iteration decimated digital signal in response to reception of said first iteration decimated digital signal;

the products of said second digital cell circuit being the outputs of said first decimator module;

said second digital cell circuit being operatively connected to provide its respective outputs to said output means;

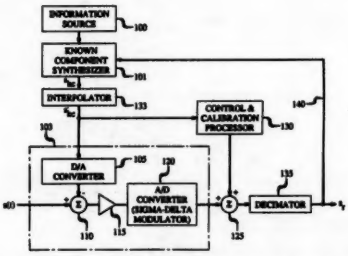
said output means providing said decimated incoming digital signal to said digital device.

4,999,627

ANALOG-TO-DIGITAL CONVERTER USING PRESCRIBED SIGNAL COMPONENTS TO IMPROVE RESOLUTION

Oscar E. Agazzi, Scotch Plains, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 25, 1989, Ser. No. 412,258
Int. Cl.[5] H03M *1/20*
U.S. Cl. 341—131 **11 Claims**



1. A circuit for converting an analog signal into an n bit digital signal representative thereof comprising:

means for receiving an analog signal having a predetermined component,

means for storing at least one information signal corresponding to the predetermined component of the received analog signal, the stored information signal comprising a plurality of stored digital signals related to the predetermined component,

means comprising a digital filter responsive to the plurality of stored digital signals for forming an m bit digital signal representative of a predetermined of the received analog signal,

means for forming an analog signal representative of the difference between the received analog signal and the predetermined component m bit digital signal,

means for converting the analog difference representative signal to an n-m bit digital signal, and

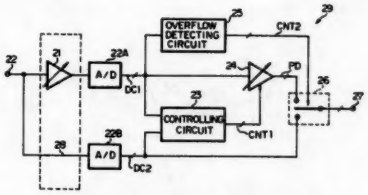
means jointly responsive to the predetermined component m bit digital signal and the n-m bit digital signal corresponding to the difference representative signal for forming the n bit digital signal representing the received analog signal.

4,999,628

ANALOG-TO-DIGITAL CONVERTING UNIT WITH BROAD DYNAMIC RANGE

Yuji Kakubo, and Hiromi Sotome, both of Shizuoka, Japan, assignors to Yamaha Corporation, Hamamatsu, Japan

Filed Jun. 15, 1990, Ser. No. 539,433
Claims priority, application Japan, Jun. 29, 1989, 1-168929
Int. Cl.[5] H03M *1/62, 1/84*
U.S. Cl. 341—139 **17 Claims**



1. An analog-to-digital converting unit comprising

(a) an input node supplied with an analog input signal,

(b) an output node supplied with a digital output signal equivalent to said analog input signal,

(c) analog level varying means having a plurality of gains and varying a magnitude of the analog input signal for producing a plurality of analog output signals different in magnitude from one another with said respective gains,

(d) a plurality of analog-to-digital converting circuits respectively supplied with said analog output signals and producing a plurality of digital code signals, respectively,

(e) a controlling circuit supplied with two of said digital code signals and calculating a difference therebetween for producing a first control signal indicative of varying one of said digital code signals in value so as to be approximately equal in value to the other digital code signal,

(f) calculating means responsive to said first control signal and causing said one of the digital code signals to be varied in value for producing a candidate of said digital output signal, and

(g) output means coupled to one of said analog-to-digital converting circuits and to said calculating means and supplying said digital output signal to said output node.

4,999,629

TWO TONE AND MULTIPLE IMAGE DISCRIMINATION AND SIGNAL BINARIZATION SYSTEM

Yuji Katsuta, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 28, 1988, Ser. No. 212,672
Claims priority, application Japan, Jun. 30, 1987, 62-164465
Int. Cl.[5] H03M *1/12;* H04N *1/40*
U.S. Cl. 341—155 **6 Claims**

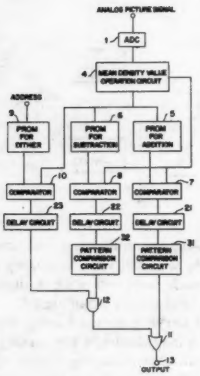
1. A picture signal binarization system for converting both multiple-tone portions and two-tone portions of an image into picture signals of accurate graylevels comprising:

operation means for computing the mean density value of points in a predetermined range around a particular point of an image to be binarized;

first determination means operatively connected to said operation means for determining whether or not the density value of the particular point is larger than a first value, said first determination means including first comparator means for comparing an output of the first determination means with an output from the operation means;

second determination means operatively connected to said operation means for determining whether or not the density value of the particular point is smaller than a second, said second determination means including a second comparator means for comparing an output from the second determination means with an output from the operation means;

a first delay circuit operatively connected to said first comparator for delaying the output of said first comparator;
a first pattern comparison circuit operatively connected to said first delay circuit;
a second delay circuit operatively connected to said second comparator for delaying the output of said second comparator;



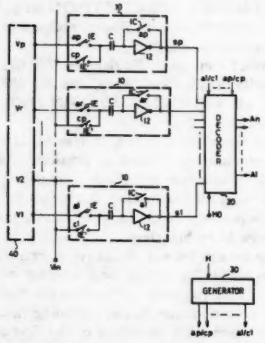
a second pattern comparison circuit operatively connected to said second delay circuit;
a third comparator operatively connected to said operation means for comparing the mean density value from the operation means with another value; and
a third delay circuit operatively connected to said third comparator.

4,999,630

FAST ANALOG-DIGITAL CONVERTER WITH PARALLEL STRUCTURE

Thierry Masson, St Egreve, France, assignor to Thomson Composants Militaires et Spatiaux, Paris, France

Filed Nov. 18, 1988, Ser. No. 273,013
Claims priority, application France, Nov. 20, 1987, 87 16073
Int. Cl.[5] H03M *1/10, 1/36*
U.S. Cl. 341—120 **8 Claims**



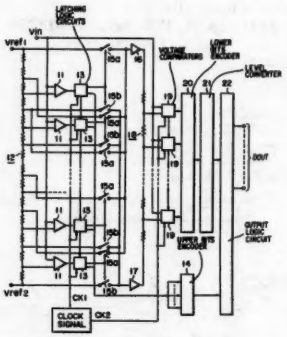
1. An analog/digital converter designed to convert an analog voltage into a digital voltage with n bits, comprising:
a plurality of comparators capable of comparing the analog voltage with a reference voltage obtained by a voltage generator, each comparator comprising an inverter amplifier, a capacitor having a first terminal connected to the input of the amplifier;
change-over switching means and a control logic circuit for these means working cyclically according to the following cycle:
during a first stage of each cycle, the amplifier is in a short-circuit feedback loop, while the reference voltage is applied to a second terminal of the capacitor;
during a second stage, the amplifier is no longer connected in the short-circuit feedback loop, and the analog voltage is applied to said second terminal of the capacitor;
wherein at a given instant, one or more but less than all the comparators are in the first stage so that, successively, each comparator goes through this first stage while the other comparators are in the second stage; and
the control logic circuit has means to generate clock signals to sequence the passage of each comparator in the first stage and then in the second stage by activation of the change over means;
said converter comprising means to decode the signals given by the comparators.

4,999,631

HIGH-PRECISION AND HIGH-SPEED ANALOG/DIGITAL CONVERTER HAVING LOW POWER CONSUMPTION

Yasuhiro Sugimoto, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 30, 1989, Ser. No. 374,064
Claims priority, application Japan, Jul. 1, 1988, 63-164622
Int. Cl.[5] H03M *1/14*
U.S. Cl. 341—156 **4 Claims**



1. An analog/digital converter comprising:
a first comparator group, in which each comparator is constituted by bipolar transistors, for comparing a plurality of different primary reference voltages with an analog input voltage;
a latch circuit group having a latch circuit which is constituted by MOS transistors, for latching comparison results of said first comparator group;
means for obtaining a first digital converted value corresponding to the analog input voltage, in accordance with storage contents of said latch circuit group;
selecting means for selecting a high-level primary reference voltage approximate to the analog input voltage and a low-level primary reference voltage, in accordance with the storage contents of said latch circuit group;
secondary reference voltage generating means for dividing a potential difference between the high-level and the low-level primary reference voltages selected by said selecting means, to generate a plurality of secondary reference voltages generated by a primary voltage generating means;
a second comparator group, in which each comparator is constituted by bipolar transistors, for comparing the plurality of secondary reference voltages generated by said

secondary reference voltage generating means with the analog input voltage;

means for obtaining a second digital converted value corresponding to the analog input voltage, in accordance with comparison results of said second comparator group; and

means for obtaining a digital converted value corresponding to the analog input voltage, in accordance with the first and second digital converted values.

4,999,632

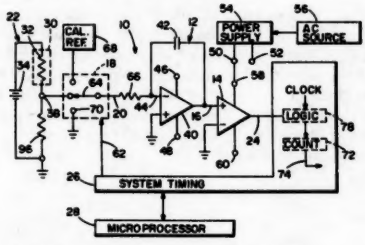
ANALOG TO DIGITAL CONVERSION WITH NOISE REDUCTION

Robert A. Parks, Springport, Ind., assignor to Boehringer Mannheim Corporation, Indianapolis, Ind.

Filed Dec. 15, 1989, Ser. No. 451,212

Int. Cl.[5] H03M 1/52

U.S. Cl. 341—167 2 Claims



1. An analog-to-digital converter comprising:

an integration circuit including an integrator for integrating an input signal;

means for discharging the integrator at a predetermined rate to obtain a measure of an amplitude of the input signal, said integrating occurring during a first interval of time, said discharging occurring during a second interval of time immediately following said first interval of time, an elapsed time of said discharging having a duration which is longer than said first interval and serving as a measure of the amplitude of said input signal, a sum of said first and said second intervals being a composite interval; and

wherein said integration circuit is operative in response to electric power obtained from A.C. excitation at any one of a plurality of frequencies commensurate in terms of a common measurement interval equal to an integral number of periods of the excitation at each of said plurality of frequencies, one of said excitation frequencies being 60 Hertz and a second of said excitation frequencies being 50 Hertz, said common measurement interval being equal to six periods of the 60 Hertz excitation, to five periods of the 50 Hertz excitation, and to four of said composite intervals to remove noise associated with the 50 Hertz and the 60 Hertz excitation; and

said converter further comprises timing means for operating said integration circuit periodically to provide an even integral number of said composite intervals during said common measurement interval, said timing means including means for strobing said integration circuit to perform said integrating during said first interval of time in each of said composite intervals; and

means for measuring the elapsed time of a discharging during each of said composite intervals, said measuring means outputting an average value of elapsed time measured during a succession of composite intervals occurring within the single common measurement interval, the average value of elapsed time being proportional to an amplitude of the input signal substantially free of interference from the A.C. excitation.

4,999,633

SELF-CALIBRATING A/D AND D/A CONVERTER

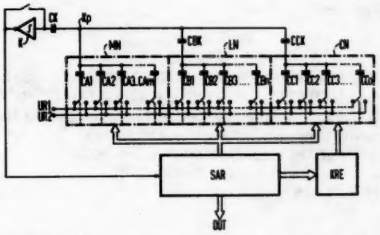
Dieter Draxelmayr, Villach, Austria, assignor to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Sep. 29, 1989, Ser. No. 415,061

Claims priority, application European Pat. Off., Sep. 30, 1988, 88116230.9

Int. Cl.[5] H03M 1/10

U.S. Cl. 341—120 10 Claims



1. Self-calibrating A/D and D/A converter operating according to the principle of charge redistribution, comprising a weighted capacitive primary converter network for most significant bits, a subsidiary converter network for bits of lesser significance, a calibration and correction network, each of said networks having capacitors, a node point, a comparator having an input connected to said node point, said capacitors of said primary converter network each being connected to said node point, a coupling capacitor connected between said capacitors of said subsidiary converter network and said node point, and another coupling capacitor connected between said capacitors of said calibration and correction network and said node point.

4,999,634

INTEGRATABLE SWITCHED-CAPACITOR SIGMA-DELTA MODULATOR

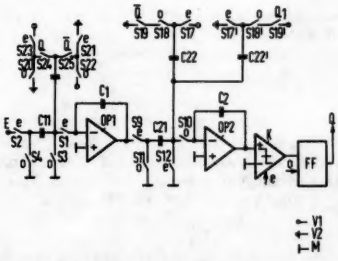
Helmut Brazdrum, München, and Rudolf Koch, Unterhaching, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed May 7, 1990, Ser. No. 520,250

Claims priority, application European Pat. Off., May 8, 1989, 89108255

Int. Cl.[5] H03M 1/12

U.S. Cl. 341—172 4 Claims



1. Switched-capacitor sigma-delta modulator, comprising at least one memory element; at least one comparator connected to said at least one memory element; at least one integrator being connected to said at least one comparator; said at least one integrator having an input stage including a series circuit of a first switch, a first capacitor having two terminals and a second switch, a third switch for connecting one of the two terminals of said first capacitor to ground potential, and a fourth switch for connecting the other of the two terminals of said first capacitor to ground potential; a nodal point con-

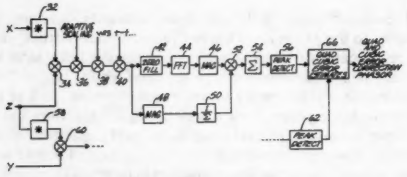
nected between said second and fourth switches and the other of the two terminals of said first capacitor; a negative feedback stage including second and third capacitors each having one terminal connected to said nodal point and each having another terminal, a fifth switch for connecting the other terminal of said second capacitor to a first potential, a sixth switch for connecting the other terminal of said third capacitor to a second potential, seventh and eighth series-connected switches for connecting the other terminal of said second capacitor to the second potential, and ninth and tenth series-connected switches for connecting the other terminal of said third capacitor to the first potential.

4,999,635

PHASE DIFFERENCE AUTO FOCUSING FOR SYNTHETIC APERTURE RADAR IMAGING

Yoji G. Niho, Rancho Palos Verdes, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 29, 1990, Ser. No. 502,000
Int. Cl.[5] G01S *13/90*
U.S. Cl. 342—25 10 Claims



1. An apparatus for automatically focusing range compressed SAR data stored in an array of range bins and azimuth lines comprising:

means for unpacking the range compressed data in each range bin;

means for generating a first and second subarray from the unpacked data;

means for conjugating the first subarray;

means for multiplying the conjugated first subarray and the second subarray to create a first product array;

means for performing a fast Fourier transform of the first product array to produce an FFT filter bank output;

means for calculating the magnitude of the FFT filter to form a correlation function;

means for integrating the correlation function over the range bins;

means for detecting a peak in the correlation function after integrating over range bins;

means for calculating a quadratic phase error responsive to the detected peak; and means for removing the calculated phase error from the range compressed data.

4,999,636

RANGE LIMITING SYSTEM

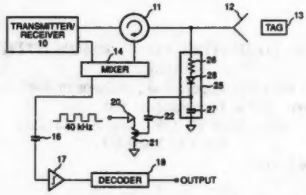
Jeremy A. Landt, Los Alamos; Alfred R. Koelle, Santa Fe, and David A. Eckhardt, Albuquerque, all of N. Mex., assignors to Amtech Technology Corporation, Santa Fe, N. Mex.

Filed Feb. 17, 1989, Ser. No. 312,617
Int. Cl.[5] G01S *13/32*
U.S. Cl. 342—90 18 Claims

1. A range limiting system for differentiating between a first received signal having a recognizable characteristic which is an amplitude above a predetermined threshold level and at least one other recognizable predetermined characteristic, and a second received signal below said predetermined threshold amplitude, comprising:

means for combining a received signal of unknown amplitude, which may be a first received signal above said predetermined threshold amplitude or a second received signal below said predetermined threshold amplitude, with a known signal of said predetermined amplitude having at least one other predetermined characteristic which is distinguishable from said other recognizable predetermined characteristic of said first received signal; and

signal processing means including amplitude comparison means for detecting relative signal amplitudes, having the combined signal as its input and which produces an output signal whose other recognizable characteristic is determined by said received signal only when said received signal is above said predetermined threshold amplitude, and by said known signal when said received signal is below said predetermined threshold amplitude, whereby the presence or absence of said first received signal may be determined on the basis of analysis of said other predetermined characteristic of said output signal of said signal processing means.

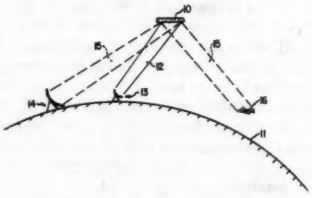


4,999,637

CREATION OF ARTIFICIAL IONIZATION CLOUDS ABOVE THE EARTH

Ronald M. Bass, Houston, Tex., assignor to APTI, Inc., Washington, D.C.

Filed May 14, 1987, Ser. No. 49,881
Int. Cl.[5] H04B *7/00*
U.S. Cl. 342—367 11 Claims



1. A method of forming a cloud of artificial ionization at an altitude above the earth, said method comprising:

initiating heating of the resident plasma at said altitude by transmitting electromagnetic radiation from the earth to said altitude at an initial frequency which is approximately the same as the original frequency of said resident plasma; and

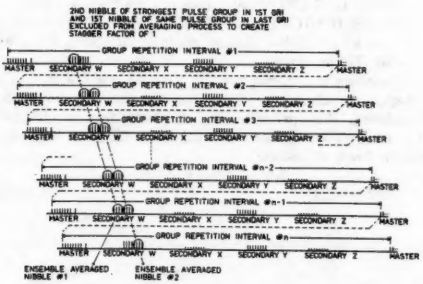
increasing said frequency of said electromagnetic radiation as said frequency of said resident plasma increases, until a final maintenance frequency is attained, said maintenance frequency being t or above the plasma frequency necessary to provide a plasma having an electron density capable of reflecting communication or like signals which come into contact with said plasma.

4,999,638

APPARATUS AND METHOD FOR SYNCHRONIZING THE SIGNAL AVERAGING CLOCK OF A LORAN C. RECEIVER TO THE CLOCK OF A LORAN C. TRANSMITTER

Paul W. Schick, Madison, Wis., assignor to LocUS, Inc., Madison, Wis.

Filed Mar. 6, 1990, Ser. No. 489,468
Int. Cl.[5] G01S *1/24*
U.S. Cl. 342—389 **18 Claims**


2ND NIBBLE OF STRONGEST PULSE GROUP IN 1ST GRI
AND 1ST NIBBLE OF SAME PULSE GROUP IN LAST GRI
EXCLUDED FROM AVERAGING PROCESS TO CREATE
STAGGER FACTOR OF 1
GROUP REPETITION INTERVAL #1
GROUP REPETITION INTERVAL #2
GROUP REPETITION INTERVAL #3
GROUP REPETITION INTERVAL #n-2
GROUP REPETITION INTERVAL #n-1
GROUP REPETITION INTERVAL #n
MASTER
SECONDARY W
SECONDARY X
SECONDARY Y
SECONDARY Z
ENSEMBLE AVERAGED NIBBLE #1
ENSEMBLE AVERAGED NIBBLE #2

1. A method of synchronizing the clock of a Loran C radio navigation receiver to the clock of a Loran C transmitter comprising the steps of:

(a) ensemble averaging together signal data encompassing at least one pulse of a Loran C station pulse group over at least two group repetition intervals to form a first ensemble averaged pulse group;

(b) ensemble averaging together signal data encompassing at least one pulse of the Loran C station pulse group to include all the pulses in the Loran C station pulse group not encompassed in the first ensemble averaged pulse group, over at least two group repetition intervals to form a second ensemble averaged pulse group;

(c) delaying the start of ensemble averaging of the second ensemble averaged pulse group with respect to the first ensemble averaged pulse group by at least one group repetition interval;

(d) further averaging the first ensemble averaged pulse group into a first single composite pulse;

(e) further averaging the second ensemble averaged pulse group into a second single composite pulse;

(f) extracting time skew differences between the first and second composite pulses; and

(g) computing the phase error from the time skew differences and adjusting the receiver clock frequency of a Loran receiver by an amount related to the computed phase error.

4,999,639

RADOME HAVING INTEGRAL HEATING AND IMPEDANCE MATCHING ELEMENTS

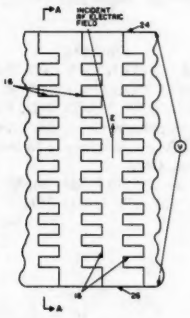
Richard F. Frazita, Saint James, and Alfred R. Lopez, Commack, both of N.Y., assignors to Hazeltine Corporation, Greenlawn, N.Y.

Filed Mar. 3, 1989, Ser. No. 318,304
Int. Cl.[5] H01Q *1/02*
U.S. Cl. 343—704 **23 Claims**

1. An antenna radome, for use in conjunction with an antenna designed to emit electromagnetic waves at a given wavelength and having an E field component, comprising:

a dielectric member formed to protect said antenna from environmental conditions;

a plurality of conductors arranged in a predetermined pattern on a major surface of said dielectric member such that said conductors extend generally in a direction parallel to the E field of incident electromagnetic waves from said antenna at said given wavelength and follow a predetermined meandering path, whereby the member with said conductors provides a lower reflection coefficient to



incident electromagnetic waves at said given wavelength than in the absence of said conductors; and

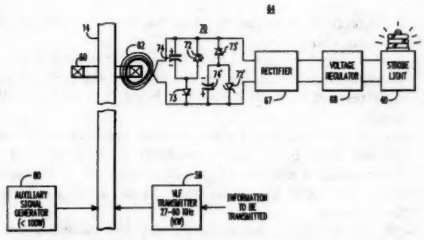
means for causing a desired heating current to flow through said conductors, thereby heating said member.

4,999,640

AEROSTAT TETHER LIGHTING APPARATUS

Myron S. Wheeler, Columbia, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 5, 1989, Ser. No. 402,574
Int. Cl.[5] H01Q *1/28*
U.S. Cl. 343—706 **7 Claims**



1. Lighting apparatus for a system utilizing a deployed aerostat maintained at a predetermined altitude by means of an electromechanical tether and wherein the electrical portion of said tether is utilized as an antenna for a transmitter, comprising:

(a) at least one clamp assembly including means for clamping around said tether at a predetermined position thereon;

(b) said clamp assembly further including a transformer core surrounding said tether, with said electrical portion of said tether constituting a single turn primary winding;

(c) a secondary winding having a plurality of turns wound around said transformer core and generating a secondary voltage;

(d) light means attached to said clamp assembly;

(e) lighting circuitry connecting said secondary winding with said light means for supplying electrical power to said light means;

(f) said lighting circuitry including a voltage limiter circuit connected to said secondary winding and operable to limit the secondary voltage generated by the secondary winding to predetermined positive and negative values and to reflect excess power back into said primary winding;

(g) rectifier means connected to said voltage limiter for supplying a unidirectional voltage;

(h) voltage regulator means connected to said rectifier

means and being operable to receive said unidirectional voltage and supply said lighting device with a regulated voltage to operate said light means; and

(i) corona shield means connected to said clamp assembly for protecting said light means and said lighting circuitry.

4,999,641

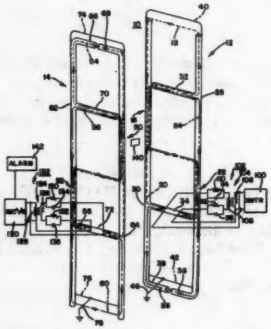
MAGNETIC ANTENNA SYSTEM HAVING INDEPENDENTLY CONTROLLABLE ELECTRICAL FIELD SHIELDING AND MAGNETIC FIELD BALANCE

Robert A. Cordery, Danbury, Conn., and Michael F. Hartings, West Carrollton, Ohio, assignors to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Sep. 1, 1989, Ser. No. 401,962

Int. Cl.[5] H01Q *7/04*

U.S. Cl. 343—742 **22 Claims**



1. A magnetic antenna for use in an electronic article surveillance system, comprising:

a twisted loop having two loop sections fabricated from an elongated conductor, said loop sections being twisted 180° with respect to each other and lying in a substantially common plane;

means for providing an electric field shield around said twisted loop including a conductive elongated shield surrounding a portion of the conductor of said twisted loop, said shield having an open circuit along the length thereof; and

means for balancing the magnetic response of said antenna including a balancing conductor connected across the open circuit to predetermined portions of the shield at opposite sides of the open circuit to thereby electrically bypass portions of the shield.

4,999,642

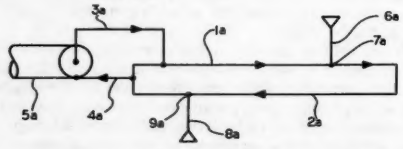
TRANSMISSION LINE COUPLING DEVICE WITH CLOSED IMPEDANCE MATCHING LOOP

Donald H. Wells, 7134 Railroad St., Holland, Ohio 43528

Continuation of Ser. No. 162,633, Mar. 1, 1988, abandoned. This application May 5, 1989, Ser. No. 347,562

Int. Cl.[5] H03H *11/28*; H01Q *9/16*

U.S. Cl. 343—822 **19 Claims**



2. A transmission line coupling device for electrical wave energy, comprising: a closed resonating conductive loop devoid of discontinuities and accommodating a wave of transmitted energy to provide a fixed range of impedance points which vary around the loop from approximately zero to a maximum, said loop having a pair of input terminals spaced apart along the loop by a distance corresponding to a given difference in impedance; and at least a first output terminal on said loop spaced apart from one of said input terminals by a distance having a desired output impedance.

4,999,643

DISCHARGE RECOVERY DEVICE AND APPARATUS HAVING SUCTION MEANS AND VENT MEANS COMMUNICATING WITH CAPPING MEANS

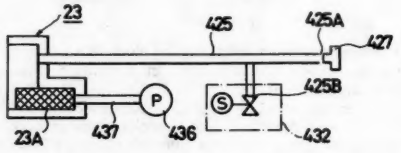
Koji Terasawa, Mitaka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 106,969, Oct. 13, 1987, abandoned, which is a continuation of Ser. No. 797,863, Nov. 14, 1985, abandoned. This application Feb. 27, 1990, Ser. No. 488,447

Claims priority, application Japan, Nov. 19, 1984, 59-244052; Nov. 19, 1984, 59-244053

Int. Cl.[5] B41V *2/165*

U.S. Cl. 346—1.1 **34 Claims**



33. A method for recovering discharge in an ink jet recording apparatus by utilizing a discharge recovery device comprising capping means having an interior for covering a discharge port for discharging ink therethrough, suction means communicating with the interior of said capping means and vent means for opening or closing the interior of said capping means to the atmosphere, said method comprising the steps of:

covering said discharge port by said capping means;

sucking ink through said capping means from said discharge port by driving said suction means and stopping communication between said capping means and the atmosphere by said vent means; and

communicating the interior of said capping means with the atmosphere using said vent means a predetermined time period after the initiation of suction by said suction means.

4,999,644

USER SELECTABLE DROP CHARGE SYNCHRONIZATION FOR TRAVELING WAVE-STIMULATED, CONTINUOUS INK JET PRINTERS

James A. Katerberg, Kettering, and David N. Pipkorn, Centerville, both of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 18, 1989, Ser. No. 451,851

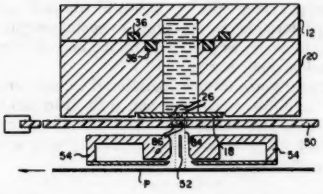
Int. Cl.[5] G01D *15/18*

U.S. Cl. 346—1.1 **6 Claims**

5. In a continuous ink jet printer of the kind having: (i) an orifice plate comprising a linear orifice array for producing a plurality of ink jets, (ii) stimulation means for imparting traveling wave vibration along the length of said orifice plate, and (iii) a plurality of selectively addressable charge electrodes located adjacent the drop break-off region of such ink jets, an improved control system for selectively shifting the location of drop charge defects incident to switching error, said system comprising:

(a) tachometer circuit means for providing a first pulse train signal having a frequency indicative of the movement of print medium past such ink jets;

(b) clock means for providing a second pulse train signal which has a fixed phase relationship to said stimulation;
(c) selectable synchronization circuit means for receiving said first pulse train signal and said second pulse train signal and producing a third pulse train signal which



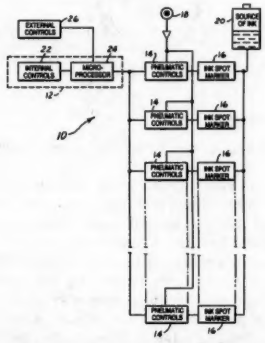
comprises pulses having a selectable phase shift relative to said second pulse train signal, and a frequency equal to the pulses of said first pulse train signal; and
(d) gate means, for producing print pulses to said charge electrodes, in accord with information signals and in synchronization with said third pulse train signal.

4,999,645

ELECTRONICALLY CONTROLLED MARKING

Michael A. Grattan, Center Line, and Sheldon J. Wolberg, Waterford, both of Mich., assignors to Dell Marking Systems, Inc., Ferndale, Mich.

Filed Jan. 29, 1990, Ser. No. 471,533
Int. Cl.[5] G01D *15/18*
U.S. Cl. 346—1.1 **30 Claims**



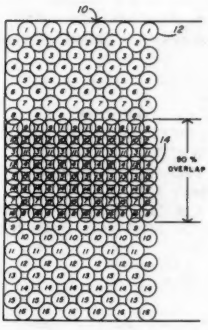
1. An electronically controlled marking system for imparting an ink spot to a stationary or moving target, the electronically controlled marking system comprising:
a high-pressure gas valve actuatable by a high-pressure gas valve solenoid and having an input and an output, the input thereof being connected to a source of high-pressure gas;
a low-pressure gas valve actuatable by a low-pressure gas valve solenoid and having an input and an output, the input thereof being connected to a source of low-pressure gas;
at least one ink spot marker having an output nozzle, an ink input connected to a source of ink, a high-pressure input connected to the output of the high-pressure gas valve, and a low-pressure input connected to the output of the low-pressure gas valve, the ink spot marker being responsive to an application of high-pressure gas to allow an ejection of ink from the output nozzle under the urging of a simultaneous application of low-pressure gas; and
an electronic control module connected to the high-pressure gas valve solenoid to control the passage of high-pressure gas from the source thereof to the high-pressure input of the ink spot marker, the electronic control module also being connected to the low-pressure gas valve solenoid to control the passage of low-pressure gas from the source thereof to the low-pressure input of the ink spot marker, an ink spot marking cycle being initiated at a time t_0, low-pressure gas being applied by the low-pressure gas valve to the ink spot marker at a subsequent time t_1, high-pressure gas being applied by the high-pressure gas valve to the ink spot marker at a subsequent time t_2, high-pressure gas being removed by the high-pressure gas valve from the ink spot marker at a subsequent time t_3, low-pressure gas being removed by the low-pressure gas valve from the ink spot marker at a subsequent time t_4, the period defined between time t_0 and time t_1 being provided to facilitate the accurate positioning of an ink spot on a moving target, the period defined between time t_1 and time t_2 being provided to allow the low-pressure gas to atomize ink within the ink spot marker, the period defined between time t_2 and time t_3 being provided to eject ink from the output nozzle of the ink spot marker, and the period defined between time t_3 and time t_4 being provided to allow the low-pressure gas to force any remaining ink from the ink spot marker output nozzle.

4,999,646

METHOD FOR ENHANCING THE UNIFORMITY AND CONSISTENCY OF DOT FORMATION PRODUCED BY COLOR INK JET PRINTING

Jeffrey L. Trask, Boise, Id., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 29, 1989, Ser. No. 444,082
Int. Cl.[5] B41J *2/21*
U.S. Cl. 346—11 **8 Claims**



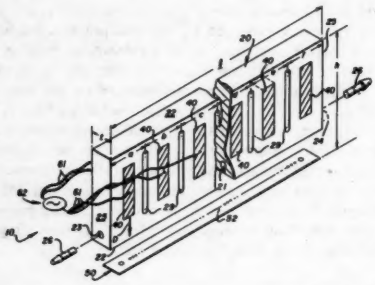
1. An ink jet printing process for enhancing the uniformity and consistency of dot formation during color ink jet printing, comprises the steps of:
a. depositing a first pattern of dots consisting of a predetermined number of dot rows such as dot rows one through sixteen herein which define a first swath or pass width over a preselected surface area of print media, and
b. depositing a second pattern of dots also consisting of a predetermined number of dot rows such as dot rows one through sixteen herein which define a second swath or pass width and which is complementary in spacing with said first pattern, and
c. overlapping only a predetermined fraction of dot rows within said first swath or pass width with a predetermined fraction of dot rows within said second swath or pass width.

4,999,647

SYNCHRONOUS STIMULATION FOR LONG ARRAY CONTINUOUS INK JET PRINTER

Wendell L. Wood; Brian G. Morris, both of Dayton; Dianne J. Aleshire, Xenia, and James A. Katerberg, Kettering, all of Ohio, assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 28, 1989, Ser. No. 458,208
Int. Cl.[5] G01D *15/18*
U.S. Cl. 346—75 11 Claims



10. An improved drop ejection device for continuous ink jet printing comprising:

(a) a resonator/manifold comprising a rectangular solid body divided by parallel, elongated through-slots into a plurality of dilatational regions that each have a longitudinal mechanical resonance mode approximately equal to the desired drop ejection frequency, said body having an ink supply recess formed in a drop ejection face, which is normal to the longitudinal axis of said through-slots;

(b) an orifice plate having a linear array(s) of orifices substantially longer than the through-slots attached to said drop ejection face; and

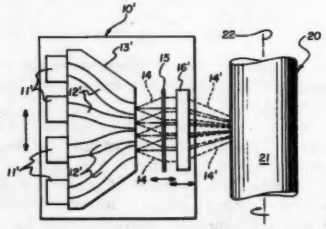
(c) at least one elongated piezoelectric strip pair attached on a major surface of a dilatational region, said strip having its longitudinal axis of expansion and contraction parallel to said slots.

4,999,648

NON-CONTACT OPTICAL PRINT HEAD FOR IMAGE WRITING APPARATUS

John R. Debesis, Penfield, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 19, 1989, Ser. No. 452,881
Int. Cl.[5] B01D *9/00*; H04N *1/21*
U.S. Cl. 346—107 R 9 Claims



1. A non-contact optical print head for simultaneously writing multiple lines of pixel information onto a photoreceptor surface comprising:

light source means for providing a plurality of individually modulated, uncollimated light beams with a first center-to-center spacing between adjacent light beams;

a diffusion screen positioned in the path of the light beams a predetermined distance from the light source means to form an array of light spots on the diffusion screen;

optical imaging means positioned between the diffusion screen and the photoreceptor surface and having a predetermined magnification for imaging the light spots from the diffusion screen onto the photoreceptor surface with a center-to-center spacing between adjacent light spots being determined by the center-to-center spacing between the light beams as processed by the magnification of the optical imaging means;

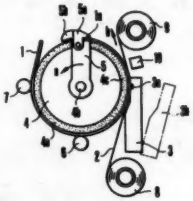
the predetermined distance between the light source means and the diffusion screen being such as to produce light spots of a desired size at the photoreceptor surface independent of the center-to-center spacing between the spots at the photoreceptor surface.

4,999,649

IMPROVED SHEET CONVEYING DEVICE FOR RECORDING APPARATUS

Yoshito Saji, Ashiya; Yoshiteru Namoto; Yoshihiro Mushika, both of Hirakata, and Haruo Yamashita, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 7, 1989, Ser. No. 432,868
Claims priority, application Japan, Nov. 11, 1988, 63-286156
Int. Cl.[5] G01D *15/24, 15/10*; B41J *13/08*
U.S. Cl. 346—134 9 Claims



1. A sheet conveying device for a recording apparatus, comprising:

roller-like carrying means having an outer peripheral surface, for supporting a recording paper sheet on the outer peripheral surface thereof, said carrying means being rotatable and having an elastic surface,

conveying means mounted to rotate relative to said roller-like carrying means, for conveying said recording paper sheet around said carrying means in close proximity to said outer peripheral surface of said carrying means by gripping a leading edge of the recording paper sheet, and

recording means for recording an image on the recording paper sheet when making pressure contact with said carrying means with said recording paper sheet interposed between said recording means and said carrying means, said carrying means being rotatable responsive to conveyance of said recording paper sheet by said conveying means due only to a friction force between said elastic surface of said carrying means and said recording paper sheet at a position of said pressure contact between said recording means and said carrying means.

4,999,650

BUBBLE JET PRINT HEAD HAVING IMPROVED MULTIPLEX ACTUATION CONSTRUCTION

Hilarion Braun, Xenia, Ohio, assignor to Eastman Kodak Company, Rochester, N.Y.

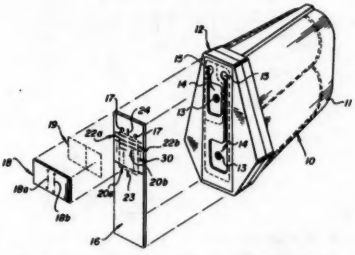
Filed Dec. 18, 1989, Ser. No. 451,709
Int. Cl.[5] B41J *2/05*
U.S. Cl. 346—140 R 2 Claims

1. In a drop-on-demand ink jet printer of the kind having a plurality of orifices, a thin film drop ejection device including

a corresponding plurality of drop ejection heater elements and manifold means of supplying ink to said heater elements, the improvement wherein said drop ejection device comprises:

(a) a support substrate;

(b) a first circuit portion comprising a plurality of circuit branches that each include a resistive heater element and a diode device formed in spaced relation on said substrate and coupled in series by first circuit branch electrode lines to terminal regions;



(c) a dielectric passivation layer overlying said first circuit portion except at the discrete terminal regions of said first circuit portion branches;

(d) a second circuit portion comprising a plurality of multiplex electrode lines overlying said dielectric passivation layer including connection sections extending through said dielective passivation layer into contact with terminal regions of said first circuit portion; and

(e) a second passivation layer overlying said second circuit portion, but not overlying said resistive heater elements.

4,999,651

MULTI-COLOR RECORDER WITH PLURAL INK JETS AND RESERVOIRS CO-MOUNTED ON A RECIPROCATING CARRIAGE, EACH RESERVOIR CONTAINING A SUB-RESERVOIR IN COMMUNICATION WITH AN INK SUPPLY CONDUIT

Peter L. Duffield, Meredith, and Arthur L. Cleary, Derry, both of N.H., assignors to Vutek Inc., Meredith, N.H.

Continuation-in-part of Ser. No. 343,917, Apr. 4, 1989, Pat. No. 4,914,522. This application Jan. 19, 1990, Ser. No. 467,657

Int. Cl.[5] G01D *15/16*; B41J *2/045, 2/11, 2/175, 2/21*

U.S. Cl. 346—140 R **11 Claims**

1. A multi-color image reproduction system comprising

a source of control signals representing an image to be reproduced,

a carriage,

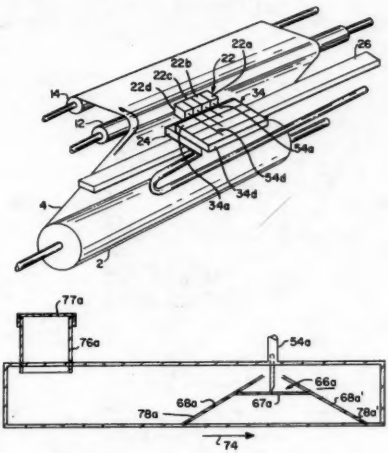
a plurality of spray heads supported by said carriage, each including a spray jet nozzle for spraying ink onto said medium,

a plurality of ink reservoirs supported by said carriage and each carrying a different colored ink,

drive means for reciprocating said carriage along a predetermined path,

a plurality of ink supply conduits each extending from one of said reservoirs to one of said spray heads, each of said conduits extending for substantially its entire length in a direction perpendicular or nearly perpendicular to said path,

a plurality of sub-reservoirs each positioned within one of said reservoirs and communicating with one of said conduits, the bottom of each of said sub-reservoirs being above the level of its associated reservoir, and



ink transfer means for transferring ink from each of said reservoirs to one of said sub-reservoirs.

4,999,652

INK SUPPLY APPARATUS FOR RAPIDLY COUPLING AND DECOUPLING A REMOTE INK SOURCE TO A DISPOSABLE INK JET PEN

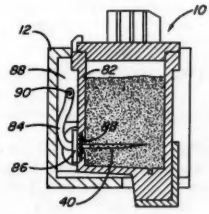
C. S. Chan, Boise, Id., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Continuation of Ser. No. 136,060, Dec. 21, 1987, Pat. No. 4,831,389. This application Feb. 21, 1989, Ser. No. 312,520

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.[5] B41J *2/175*

U.S. Cl. 346—140 R **5 Claims**



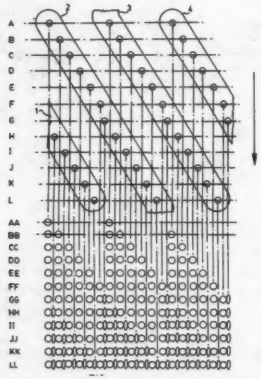
1. An apparatus for rapidly coupling and decoupling a remote source of ink supply to a disposable ink jet pen filled with a porous ink storage material and without requiring an air-tight seal at the connection of ink into the pen, characterized in that: a capillary tube extends from said remote source of ink supply to said pen and has a needle mounted at one end thereof for easy penetration into and removal from said porous material within a storage compartment of said disposable ink jet pen, whereby capillary action of said porous material acting on said needle is used to draw ink by capillary action from said remote source of ink supply into said pen, thereby allowing the free liquid surface of said remote ink supply to be positioned below an ink ejection plane of said pen and thus preventing ink from drooling therefrom.

4,999,653

VENETIAN BLINDING

Robert S. McCallum, Terra Cotta, Canada, assignor to Delphax Systems, Mississauga, Canada

Filed Nov. 8, 1989, Ser. No. 433,238
Int. Cl.[5] G01D *15/06*
U.S. Cl. 346—159 9 Claims



1. A print cartridge for charged particle deposition of latent images on a receptor surface adapted to move longitudinally, the cartridge comprising:

driver electrodes extending transversely with respect to the movement of the receptor surface;

dielectric means covering the driver electrodes; and

finger electrodes on the dielectric means extending angularly with respect to the driver electrodes with the dielectric separating the finger and driver electrodes, the finger electrodes defining primary and secondary apertures where the driver and finger electrodes intersect for depositing latent images of discrete dots spaced transversely on the receptor surface upon selective activation of the driver and finger electrodes, the apertures in each finger electrode being counted in the direction of motion of the receptor surface and the majority being separated transversely from one another by at least two dot spaces and the second and last apertures being spaced transversely with reference respectively to the first and last-but-one apertures in the same transverse direction.

4,999,654

IMAGE FORMING SYSTEM

Fumitaka Maruo, Yokohama, and Akira Hosoya, Yokosuka, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Nov. 8, 1989, Ser. No. 435,629
Claims priority, application Japan, Nov. 14, 1988, 63-287142; Nov. 14, 1988, 63-287143; Aug. 28, 1989, 1-220779
Int. Cl.[5] G01D *15/14*
U.S. Cl. 346—160 6 Claims

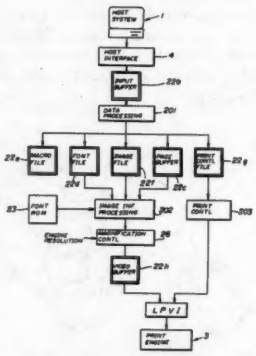
1. An image forming system comprising:

an image processing device which receives information to be recorded and which generates image data from said information;

an image forming device which receives said image data and forms an image defined by said image data on a recording medium;

optional units detachably coupled to said image forming device and having at least one recording medium feed unit which feeds said recording medium and at least one recording medium eject unit which ejects said recording medium supplied from said image forming device; and

status change notifying means, coupled to said image processing device, said image forming device and said optional units, for sending an asynchronous message to said image processing device immediately when a status



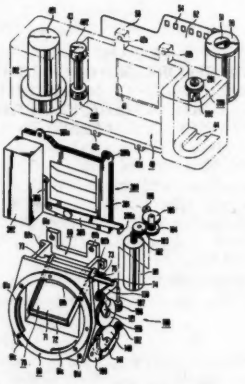
change of a device selected from the group consisting of said image forming device and said optional units takes place.

4,999,655

MOTOR DRIVEN CAMERA

Hidehiko Fukahori; Masayuki Suzuki, and Yoshihiko Aihara, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 139,844, Dec. 29, 1987, Pat. No. 4,881,092.
This application Aug. 31, 1989, Ser. No. 401,877
Claims priority, application Japan, Jan. 7, 1987, 62-002172; Jan. 7, 1987, 62-002177; Jan. 7, 1987, 62-002178
Int. Cl.[5] G03B *1/12*
U.S. Cl. 354—173.1 4 Claims



1. A motor driven camera comprising:

(a) a first motor;

(b) a film rewind drive mechanism for driving film in a rewinding direction by said first motor serving as a drive source;

(c) a second motor;

(d) a film windup drive mechanism for driving the film in the winding up direction by said second motor serving as a drive source, said film windup drive mechanism including a planetary clutch arranged upon rotation of said second motor in one direction to bring a windup transmission system into connection with said second motor, and upon

rotation of said second motor in another direction to take said windup transmission system out of connection; and

(e) a motor control circuit, receptive of a signal representing start of a film rewinding, for driving said first motor in the rewinding direction and said second motor in said other direction.

4,999,656

INTERCHANGEABLE LENS WITH DOUBLE-SIDED PRINTED CIRCUIT BOARD

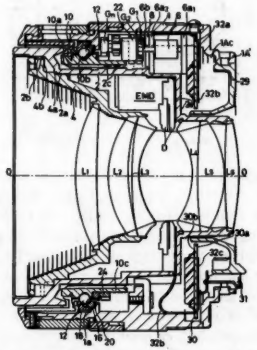
Masami Shimizu, Tokyo; Shigeo Nakashima; Yutaka Fujiwara, both of Kawasaki, and Masaharu Eguchi, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 24, 1989, Ser. No. 356,236

Claims priority, application Japan, May 24, 1988, 63-126371; May 24, 1988, 63-126372

Int. Cl.[5] G03B *1/18*

U.S. Cl. 354—195.12 **24 Claims**



1. An interchangeable lens comprising:

double-sided printed circuit board with a front side and a rear side that is disposed such that its major plane extends substantially orthogonally to an optical axis of optical elements disposed axially along a lens barrel;

electrical elements;

at least one flexible connecting member for electrically connecting said electrical elements into electrical circuits on said double-sided printed circuit board;

integrated circuit chip elements mounted on the front side of said double-sided printed circuit board which is directed forwardly of said lens barrel as viewed in the direction of said optical axis;

lands provided on the rear side of said double-sided printed circuit board which is directed rearwardly of said lens barrel as viewed in the direction of said optical axis, said lands including lands for connection to said flexible connecting members and at least one check land for allowing electrical check of an electrical circuit; and

a mount member provided on a rear end of said interchangeable lens as viewed in the direction of the optical axis, said mount member being capable of demountably mounting said interchangeable lens to a camera body.

4,999,657

METHODS AND APPARATUS FOR TAKING PORTRAITS

Thomas J. Leuer, 917 Harden St., Aurora, Ill. 60506

Filed Apr. 4, 1990, Ser. No. 504,599

Int. Cl.[5] G03B *13/02*

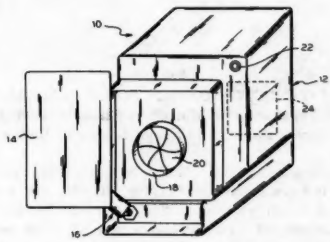
U.S. Cl. 354—220 **4 Claims**

1. Apparatus for taking a portrait photograph of at least one subject in a selected field, said apparatus comprising

(a) camera means for exposing a photographic negative to make an exposure;

(b) mirror means for reflecting the field to the subject within the field; and

(c) means for adjustably mounting said mirror means on said camera means;



(d) said mounting means comprising a first ball and socket joint secured to aid camera means, a second ball and socket joint secured to said mirror means, and a shaft secured between said first and second ball and socket joints, said first and second ball and socket joints being tight enough to hold said mirror means in a fixed position during use, while at the same time allowing adjustment of said mirror means.

4,999,658

VIEWFINDER OF THE REAL IMAGE TYPE

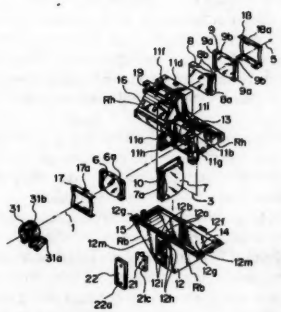
Masatoshi Kamitani, and Toshihiro Fujiwara, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 24, 1989, Ser. No. 315,941

Claims priority, application Japan, Feb. 27, 1988, 63-45282; Feb. 27, 1988, 63-45283; Mar. 4, 1988, 63-52380; May 16, 1988, 63-116897

Int. Cl.[5] G03B *13/08*

U.S. Cl. 354—225 **13 Claims**



12. A viewfinder of the real image type, comprising a first mirror holder in the form of a box having two walls angularly positioned with each other and opened at a side opposing to the two walls thereof, a second mirror holder formed from a pair of boxes each having a wall connected at side faces thereof to each other such that the walls thereof are inclined in opposite directions to each other, each of said boxes of said second mirror holder being opened at two mutually perpendicular sides thereof in an opposing relationship to the walls thereof, said first and second mirror holders being connected to each other with the opening of said first mirror holder joined to a pair of contiguous ones of the openings of said second mirror holder such than an internal spacing is formed by said first and second mirror holders, each of the four walls having a window

formed therein, and an image inverting optical system disposed in said internal spacing, said image inverting optical system including a mirror fitted to close up each of the windows.

4,999,659

CONNECTOR DEVICE FOR A CAMERA

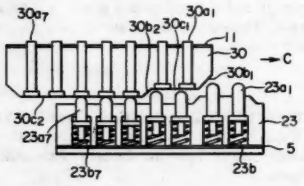
Hidehiko Fukahori, and Mutsuhide Matsuda, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 279,233, Nov. 29, 1988, abandoned, which is a continuation of Ser. No. 205,486, Jun. 1, 1988, abandoned, which is a continuation of Ser. No. 16,653, Feb. 19, 1987, abandoned. This application Nov. 15, 1989, Ser. No. 436,106

Claims priority, application Japan, Feb. 24, 1986, 61-37484

Int. Cl.[5] G03B *17/00*

U.S. Cl. 354—286 116 Claims



1. A connector device for a camera having a camera body mount, a rotatively mountable-dismountable type optical accessory mount capable of being coupled and uncoupled by rotation around an optical axis thereof relative to said camera body mount, a plurality of camera body connection terminals disposed on a smaller diameter peripheral area than a mount surface of said camera body mount, and a plurality of optical accessory connection terminals, each disposed in the direction of the optical axis, and adapted to contact with said camera body connection terminals during rotative coupling, formed on a smaller diameter peripheral area than a mount surface of said optical accessory mount, said connector device comprising:

(a) at least one height level difference of said camera body connection terminals in the direction of the optical axis, said camera body connection terminals being disposed in a curvelinear formation around the optical axis;

(b) a height level difference of said optical accessory connection terminals in the direction of the optical axis, the height level difference of said optical accessory connection terminals being arranged so that the camera body connection terminals and the corresponding optical accessory connection terminals may be in contact with each other when the rotative coupling of said camera body mount and said optical accessory side mount has been completed;

(c) a locking member provided on said camera body mount; and

(d) a groove provided on said optical accessory mount, said locking member being inserted into said groove when the rotative coupling of said optical accessory connection terminals and said camera body connection terminals is completed, and said groove being disposed at a position displaced by substantially 90 degrees from said optical accessory connection terminals in a direction around the optical axis.

4,999,660

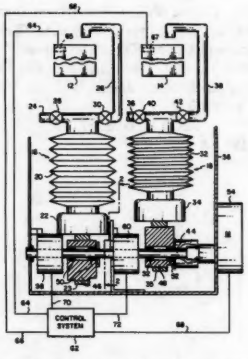
DUAL CHAMBER PUMP ASSEMBLY AND A REPLENISHMENT SYSTEM FOR A FILM PROCESSOR INCORPORATING SUCH A PUMP ASSEMBLY

Thomas S. Wright, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 16, 1990, Ser. No. 494,354

Int. Cl.[5] G03D *3/06*

U.S. Cl. 354—324 3 Claims



1. In a film processor having a plurality of tanks for solutions used in processing film, a plurality of pumps for providing replenishment solutions to the tanks when portions of the solutions are depleted during processing of film, and means for connecting each of the pumps to a tank and to a source of replenishment solution, the improvement comprising:

a single drive shaft for driving all of the pumps;

a motor for rotating the shaft about an axis;

a plurality of clutches, each of the clutches being coupled to the shaft and, when engaged, to one of the pumps; and

means for selectively engaging the clutches individually or simultaneouly in response to sensing the levels of solutions in the tanks.

4,999,661

CAMERA HAVING SELECTIVE FUNCTIONS

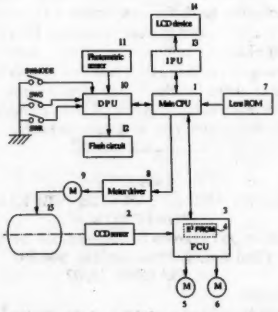
Fuminori Ueno, Hachioji, and Yutaka Ohsawa, Tokyo, both of Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 21, 1989, Ser. No. 439,844

Claims priority, application Japan, Nov. 22, 1988, 63-295769

Int. Cl.[5] G03B *7/00, 13/36*

U.S. Cl. 354—402 22 Claims



1. A function selective camera which is equipped with an

automatic focusing device having a CCD distance measuring sensor and which enables the selection of a plurality of functions and/or data concerning camera functions, wherein the improvement comprises:

a code table containing codes expressing information concerning said plurality of functions and/or data, said code table being provided separately from said camera;

an optical system for forming an image of said code table on said CCD distance measuring sensor; and

a function selecting means for analyzing said image of said code formed on said CCD distance measuring sensor on the basis of an output of said sensor and rewriting said functions or data stored in a memory.

4,999,662

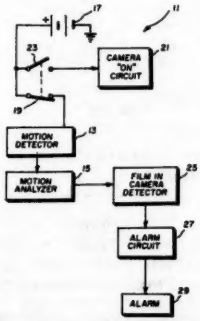
METHOD AND APPARATUS FOR INDICATING AN OPERATING CONDITION OF A CAMERA PRIOR TO USE

Robert S. Bryant, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed May 24, 1990, Ser. No. 528,315

Int. Cl.[5] G03B 7/00

U.S. Cl. 354—412 **10 Claims**



1. A method for indicating an operating of a camera prior to use thereof, comprising the steps of:

(a) detecting handling of the camera by a photographer;

(b) analyzing an operating condition of the camera when handling of the camera by the photographer is detected; and

(c) generating an alarm when the analysis of the operating condition indicates an improper operating condition.

4,999,663

FLASH DEVICE

Hiroaki Nakamura, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed Dec. 5, 1989, Ser. No. 446,400

Claims priority, application Japan, Dec. 9, 1988, 63-311619; Jan. 31, 1989, 1-22115

Int. Cl.[5] G03B 7/00

U.S. Cl. 354—415 **45 Claims**

1. A combination of a picture taking apparatus and a flash device,

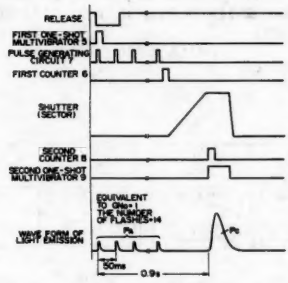
said picture taking apparatus including:

a first time counting circuit which begins time counting operation in response to a depression output of a shutter release button for providing an output after a first predetermined period of time;

a second time counting circuit which begins time counting operation in response to an output from the first time counting circuit for providing an output after a second period of time;

a pulse generator which generates output pulses at intervals of a predetermined period of time in response to the depression output of a release button and stops generating pulses in response to the output from the first time counting circuit; and

a shutter which opens responsive to the output from the first time counting circuit;



said flash device including a driving circuit selectively responsive to the pulse outputs and the output from the second time counting circuit for firing a flash tube.

4,999,664

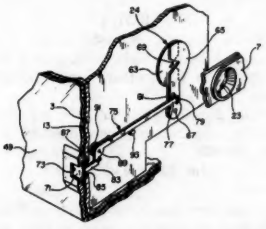
AUTOMATIC EXPOSURE CONTROL APPARATUS FOR DAYLIGHT/UNDERWATER CAMERA

Gregory B. Foust, Spencerport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 9, 1990, Ser. No. 506,050

Int. Cl.[5] G03B 7/08, 17/08

U.S. Cl. 354—446 **7 Claims**



1. A camera capable of underwater photography comprising an inner shell and an outer water pressure-resistant casing is characterized by including:

pressure sensitive means exposed through an opening in said outer casing for actuation responsive to water pressure;

adjustable exposure control means located within said inner casing; and

coupling means for connecting said pressure sensitive means and said exposure control means to adjust the exposure control means in accordance with actuation of the pressure sensitive means responsive to water pressure.

4,999,665

CAMERA WITH DISPLAY DEVICE

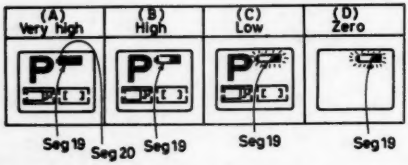
Hirokazu Kuroda; Masaaki Nakai; Takehiro Katoh; Tetsuro Ohya; Shuji Izumi, and Akira Okuno, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 16, 1989, Ser. No. 352,257

Claims priority, application Japan, May 16, 1988, 63-119008; May 16, 1988, 63-119009; May 16, 1988, 63-119010; May 16, 1988, 63-119011

Int. Cl.[5] G03B *17/20*

U.S. Cl. 354—468 16 Claims



1. A camera with a display device, comprising:

manually operable means having a first state in which the camera cannot be operative and a second state in which the camera can be operative for changing over from one state to the other state;

timer means for counting a predetermined period of time in response to a change of said manually operable means from the first state into the second state;

a battery for supplying electrical power to circuits in the camera;

battery checking means for checking a state of said battery;

display means for displaying the state of said battery based on a result of said battery checking means during at least the predetermined period of time, said display means having a first mode indicating that the state of said battery is better for the camera than a predetermined state and a second mode indicating that the state of said battery is not better for the camera than the predetermined state; and

means for turning off said display menas, after lapse of the predetermined period of time, when said display means is in the first mode and for causing said display means to remain on irrespective of the lapse predetermined period of time when said display means is in the second mode.

4,999,666

IMAGE FORMING APPARATUS HAVING DRIVE CONTROL UNIT

Satoru Kuwabara, Chiryu; Takeshi Izaki, Nagoya; Kenji Sakakibara, and Masanari Kobayashi, both of Ichinomiya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Jan. 24, 1990, Ser. No. 469,242

Claims priority, application Japan, Jan. 28, 1989, 1-19068; Jan. 30, 1989, 1-20402

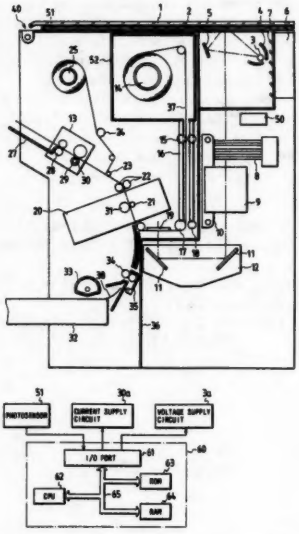
Int. Cl.[5] G03B *27/32*

U.S. Cl. 355—27 5 Claims

1. An image forming apparatus including elements for performing a series of copying processes to form an image on a sheet and at least one power source for commonly supplying a power to the elements, comprising:

sensor means for detecting an operational condition of each of the elements and outputting a detection signal representative of the operational condition; and

control means for controlling the power supply from said power source to the elements so that when the power supply to one of the elements is carried out to drive said one of the elements, the power supply to at least one of the other elements is ceased to stop the driving of said at least one of the other elements, and controlling said one of the elements on the basis of the detection signal from said sensor means so that the operational condition of said one



of the elements is substantially equal to a predetermined operational condition.

4,999,667

METHOD OF CONTROLLING DRYING IN PHOTOGRAPHIC PROCESSING APPARATUS

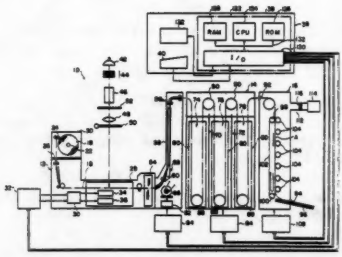
Osamu Fukushima, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 9, 1990, Ser. No. 478,183

Claims priority, application Japan, Feb. 15, 1989, 1-35560

Int. Cl.[5] G03B *27/52*; G03D *3/08*; F26B *13/12*

U.S. Cl. 355—28 12 Claims



1. A drying control method in a photograph processing apparatus for controlling the drying conditions through feed control of a photosensitive material in a photograph processing apparatus which is comprised of a printing section to print an image on the photosensitive material, a processor section to perform the developing, fixing and water washing processing for the photosensitive material on which the image has been printed, and a drying section to dry the photosensitive material having been processed in said processor section, comprising:

a first step of detecting a processed area of the photosensitive material in said printing section; and

a second step of sending sheets of the photosensitive material into said drying section with a predetermined time inter-

val when the processed area of the photosensitive material detected by said first step is not greater than a predetermined area, and sending sheets of the photosensitive material into said drying section with a time interval dependent on the processed area of the photosensitive material, when the processed area of the photosensitive material detected by said first step exceeds the predetermined area.

4,999,668

EXPOSURE CONTROL METHOD FOR PHOTOGRAPHIC PRINTER

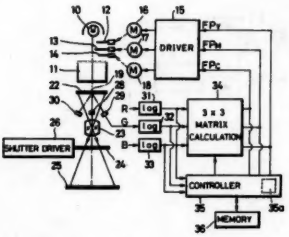
Kenji Suzuki, and Hiroaki Nakamura, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Tokyo, Japan

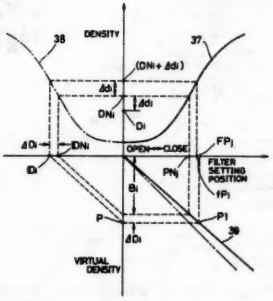
Filed Mar. 29, 1990, Ser. No. 500,990

Claims priority, application Japan, Mar. 29, 1989, 1-77887; Sep. 11, 1989, 1-235397; Mar. 5, 1990, 2-53458

Int. Cl.[5] G03B 27/78

U.S. Cl. 355—38 **11 Claims**





1. An exposure control method for a photographic printer which has yellow, magenta and cyan color correction filters between a light source and a negative film, wherein the insertion quantity of each color correction filter into a printing optical path is controlled by adjusting the three color components of a printing light with which an image frame of the negative film is printed on a color paper, said method comprising the following steps:

measuring said image frame to obtain three measured light amounts, one for each of three primary colors;

logarithmically converting said three measured light amounts to obtain three measured densities, one for said each of three primary colors; and

subjecting said three measured densities to a first matrix calculation for obtaining a setting position of each of said color correction filters, said first matrix calculation determining a setting position of each of said color correction filters by considering all of said three measured densities of said three primary colors.

4,999,669

LEVELLING DEVICE IN AN EXPOSURE APPARATUS

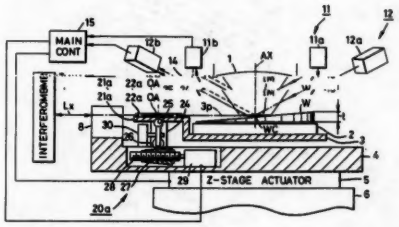
Hideaki Sakamoto, and Kesayoshi Amano, both of Tokyo, Japan, assignors to Nikon Corporation, Tokyo, Japan

Filed Jul. 12, 1989, Ser. No. 378,981

Claims priority, application Japan, Jul. 18, 1988, 63-178560

Int. Cl.[5] G03B 27/42

U.S. Cl. 355—53 **11 Claims**



1. An exposure apparatus for forming a pattern of a mask on a surface of a photo-sensitive substrate, comprising:

an X-Y stage movable along orthogonal X and Y axes parallel to an exposure reference plane;

a Z-stage on said X-Y stage and movable relative thereto along a Z-axis orthogonal to said X and Y axes;

a levelling stage on said Z-stage and inclinable relative to a levelling reference plane that is parallel to said exposure reference plane, said levelling stage having means for holding said photosensitive substrate thereon;

levelling means for moving predetermined points of said levelling stage along said Z-axis;

first detecting means for detecting deviation of a reference point of said photo-sensitive substrate from said exposure reference plane along said Z-axis;

second detecting means for detecting inclination of said surface of said photo-sensitive substrate relative to said levelling reference plane; and

control means responsive to said first detecting means for moving said Z-stage in one direction along said Z-axis relative to said X-Y stage to make said reference point of said photo-sensitive substrate coincident with said exposure reference plane, for controlling said levelling means to move all of said predetermined points of said levelling stage by the same amount in said one direction along said Z-axis to make said reference point of said photo-sensitive substrate coincident with said levelling reference plane, while moving said reference point of said photosensitive substrate relative to said exposure reference plane, and for moving said Z-stage in the opposite direction along said Z-axis to make said reference point of said photo-sensitive substrate and said levelling reference plane coincident with said exposure reference plane, said control means being responsive to said second detecting means to control said levelling means so as to provide relative movement between at least some of said predetermined points of said levelling stage to change the inclination of said surface of said photo-sensitive substrate so as to make said surface substantially coincident with said exposure reference plane.

4,999,670

PRINTER WITH PRINT MEDIA SUPPORT SYSTEM

Ronald F. Wright, Corvallis, Oreg., assignor to CH_2M Hill, Inc., Corvallis, Oreg.

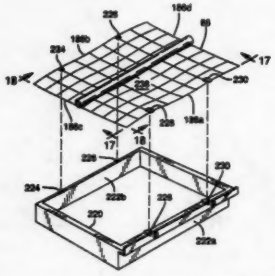
Filed May 19, 1989, Ser. No. 355,172

Int. Cl.[5] G03B 27/20

U.S. Cl. 355—91 **20 Claims**

1. A print making apparatus having a plate with first and second opposed edges and third and fourth opposed edges, the plate comprising means for supporting one or more original

sheets and a sheet of photosensitive media, means for supporting the plate in position to receive the sheets, cover means for movement between a first position off of the sheets and a second position covering the sheets, means for drawing air from between the cover means and sheets as the cover means is moved between the first and second positions, means for



mechanically pressing the cover means against the sheets and plate as the cover means is moved between the first and second positions, and the means for supporting the plate comprises means for supporting the plate only along the first and second opposed edges, whereby sagging of the plate along lines extending between the third and fourth opposed edges is reduced.

4,999,671

RETICLE CONVEYING DEVICE

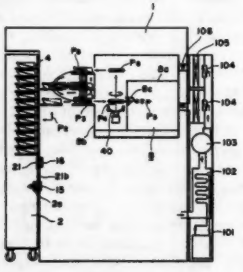
Kazuo Iizuka, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 368,894, Jun. 21, 1989, abandoned, which is a continuation of Ser. No. 71,742, Jul. 9, 1987, abandoned. This application May 29, 1990, Ser. No. 528,903

Claims priority, application Japan, Jul. 11, 1986, 61-162131; Jul. 11, 1986, 61-162132; Jul. 11, 1986, 61-162133; Jul. 11, 1986, 61-162134; Jul. 11, 1986, 61-162135; Jul. 11, 1986, 61-162136; Jul. 11, 1986, 61-162137; Jul. 11, 1986, 61-162138; Jul. 11, 1986, 61-162139; Jul. 11, 1986, 61-162140

Int. Cl.[5] G03B *27/04*

U.S. Cl. 355—97 **10 Claims**



1. A reticle conveying system usable with a reticle keeping shelf having a plurality of supports for supporting a plurality of reticles, for conveying a reticle between the keeping shelf and an exposure station, said system comprising:

a first conveying mechanism for conveying a reticle along a first path extending between the keeping shelf and the exposure station;

a second conveying mechanism for conveying a reticle along a second path, different from the first path, and extending between an intermediate position along the first path snd an inspecting station, different from the exposure station; and

inspecting means provided at the inspecting station for inspecting a reticle conveyed thereto;

wherein said first and second conveying mechanisms are operable so that during exposure of a first reticle at the exposure station, a second reticle is conveyed to the inspecting station for inspection thereof.

4,999,672

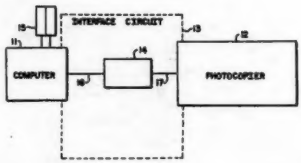
COMPUTER CONTROL OF PHOTOCOPIERS

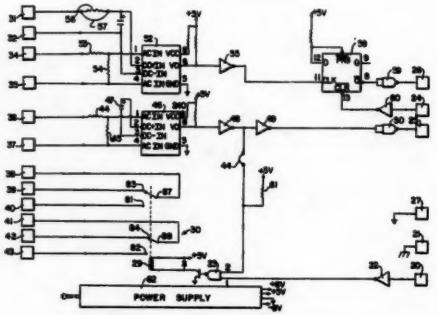
Owen Rice, Jr., and Bruce A. Joblonicky, both of Tampa, Fla., assignors to Lex Systems Southeast, Tampa, Fla.

Filed Aug. 15, 1983, Ser. No. 523,100

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—202 **6 Claims**





1. Interface apparatus for connecting a computer having binary logic signalling with a photocopier or the like not integral with said computer having line signalling so that said computer controls the enabling of said copier comprising:

a. first terminals for receiving said logic output signals from said computer, second terminals for transmitting line input signals to said copier and means for converting said logic output signals to said line input signals connected between said first terminals and said second terminals,

b. third terminals for receiving said line output signals from said copier responsive to said logic output signals from said computer, fourth terminals for transmitting logic input signals to said computer and means for converting said line output signals to said logic input signals connected between said third terminals and said fourth terminals,

c. means for storing said logic input signals from means (b);

d. means for resetting said logic input signal storage means (c). and

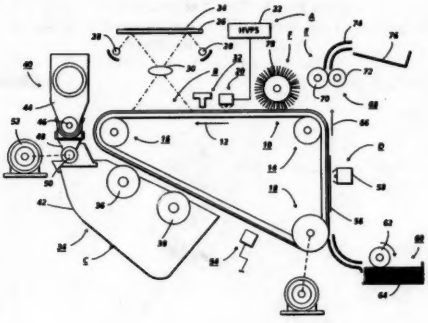
e. cable means for connecting said interface terminals to said computer and said copier terminals respectively.

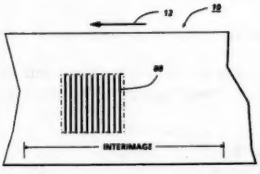
4,999,673

PROCESS CONTROL BY CREATING AND SENSING HALF-TONE TEST PATCHES

Jan Bares, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed May 10, 1989, Ser. No. 349,734
Int. Cl.[5] G03G *21/00*
U.S. Cl. 355—208 8 Claims





1. An electrophotographic printing machine of the type having a photoconductive member and a plurality of processing stations, wherein the improvement includes:

means for recording a test patch having a half tone image on the photoconductive member, said recording means comprising means for charging a portion of the photoconductive member, means for illuminating a selected region of the charged portion of the photoconductive member with a laser beam, and means for modulating the laser beam to record the test patch having the half tone image on the photoconductive member;

means for developing the test patch with developer material to form a developed half-tone image on the photoconductive member; and

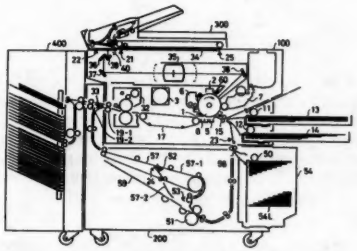
means, responsive to the average density of the developed half-tone image on the photoconductive member, for regulating the parameters of the processing stations.

4,999,674

IMAGE FORMING APPARATUS HAVING SYNTHETIC RECORDING FUNCTIONS

Masanori Miyata, Yokohama; Yutaka Komiya; Shinichi Nakamura, both of Tokyo; Masayuki Hirose, Yokohama; Toshihiko Mori, and Tomobumi Nakayama, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 87,962, Aug. 17, 1987, Pat. No. 4,825,250, which is a continuation of Ser. No. 770,190, Aug. 28, 1985, abandoned. This application Feb. 27, 1989, Ser. No. 315,844
Claims priority, application Japan, Aug. 30, 1984, 59-182283; Sep. 4, 1984, 59-184861; Sep. 4, 1984, 59-184862; Sep. 4, 1984, 59-184863; Sep. 4, 1984, 59-184864; Oct. 2, 1984, 59-206626; Oct. 2, 1984, 59-206627
Int. Cl.[5] G03G *15/00*
U.S. Cl. 355—218 12 Claims



1. An image forming apparatus comprising:

a platen for placing first and second originals side by side thereon;

scanning means for scanning said first and second originals placed on said platen side by side, wherein in a first scanning operation said scanning means moves in a first direction in order to scan said first original, and then moves in a second direction, and in a second scanning operation said scanning means moves the first direction in order to scan said second original;

image forming means for forming on a recording medium both a first latent image corresponding to the scanned first original and a second latent image corresponding to the scanned original;

developing means for developing said first and second latent images formed on said recording medium; and

charge control means for, in the second scanning operation of said scanning means, causing a predetermined area on said recording medium corresponding to an area overlapping upon the first scanning operation to become a non-charge state prior to a development of the second latent image.

4,999,675

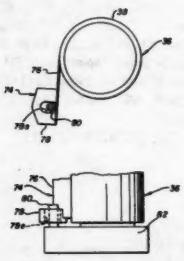
MAGNETIC BRUSH DEVELOPMENT APPARATUS INCLUDING A SELF-ADJUSTABLE TAKE-OFF SKIVE

Larry W. Speer, Hilton, and Susan P. Westbrook, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 1, 1989, Ser. No. 444,209
Int. Cl.[5] G03G *15/06*
U.S. Cl. 355—245 5 Claims

1. An improved magnetic brush development apparatus for applying developer material to a latent image on a moving image carrying member, said apparatus including a housing having a portion defining a sump adapted to contain a supply of developer material, a magnetic brush located substantially within said housing in spaced relation to said sump portion for applying developer material to the latent image, a feed mechanism including a metering assembly located within said housing between said sump portion and said magnetic brush for transporting developer material from said sump to said mag-

netic brush, and a take-off skive for stripping development material from said magnetic brush after application to a latent image and directing such material to said sump portion, said skive including a scraper blade and mounting members attached at opposite ends of said scraper blade, said improvement comprising:



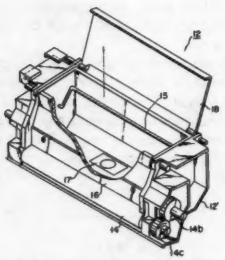
means for mounting said take-off skive so that said skive is self-adjustably supported between said metering assembly and said magnetic brush, said mounting means including support means fixed to said magnetic brush for supporting said mounting members with limited relative movement between said mounting members and said support means.

4,999,676

IMAGE FORMING APPARATUS HAVING COMMON SIGNAL LINES

Takashi Mouri, Iruma, Japan, assignor to Casio Computer Co., Ltd. and Casio Electronics Manufacturing Co., Ltd., Tokyo, Japan

Filed Mar. 22, 1990, Ser. No. 497,540
Claims priority, application Japan, Mar. 27, 1989, 1-74238; Oct. 25, 1989, 1-278042; Nov. 29, 1989, 1-138201[U]
Int. Cl.[5] G03G *15/08*
U.S. Cl. 355—246 **20 Claims**



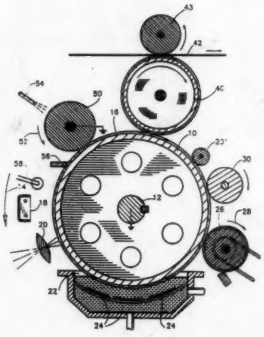
1. An image forming apparatus comprising:
an image forming unit, detachably mounted in a main body of said image forming apparatus and having at least a developing device for storing a predetermined developer for forming a desired image;
sensor means, arranged on the side of said image forming unit, for detecting a state of the developer in said developing device and generating a detection signal;
connecting means, arranged on the side of said image forming unit, for outputting the detection signal generated by said sensor means to said main body;
transmitting means, having a single portion to be connected arranged on said main body side, for transmitting, to said main body side, the detection signal generated by said sensor means and a signal representing a mounting state of said image forming unit, which is generated in accordance with a coupling state of said connecting means of said image forming unit with respect to said single portion to be connected; and
discriminating means, having a single input terminal for receiving a signal from said single portion of said transmitting means, for discriminating a state of the developer in said developing device and a mounting state of said image forming unit with respect to said main body on the basis of a state of the signal input to said input terminal.

4,999,677

IMAGING SYSTEM WITH RIGIDIZER

Benzion Landa, Edmonton, Canada, and Paul Fenster, Petach Tikva, Israel, assignors to Spectrum Sciences B.V., Rotterdam, Netherlands

Filed Feb. 6, 1989, Ser. No. 306,062
The portion of the term of this patent subsequent to Nov. 27, 2007, has been disclaimed.
Int. Cl.[5] G03G *15/10, 15/16*
U.S. Cl. 355—273 **18 Claims**



1. Apparatus for enhancing liquid toner image transfer comprising:
an image bearing surface movable in a first direction;
means for forming a liquid toner image on said image bearing surface;
a second surface arranged for movement relative to said image bearing surface whereby portions of the image bearing surface and the second surface sequentially come into propinquity and subsequently move out of propinquity;
potential impression means associated with at least one portion of at least one of the image bearing surface and the second surface for impressing a potential on said at least one portion; and
means for energizing said potential impression means only when such portions are located at predetermined locations along the pathway, thereby to provide image rigidization,
wherein said second surface is the surface of a roller and moves opposite to the movement of said image bearing surface thereby providing metering of excess liquid on said image bearing surface.

4,999,678

CLEANING APPARATUS FOR CLEANING THE SURFACE OF A PHOTOSENSITIVE MEMBER

Keigo Tange, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

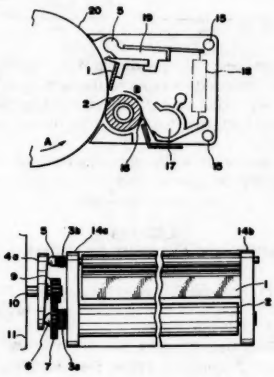
Filed Jan. 25, 1989, Ser. No. 301,869
Claims priority, application Japan, Jan. 26, 1988, 63-9113[U]
Int. Cl.[5] G03G *21/00*
U.S. Cl. 355—297 **11 Claims**

1. A cleaning apparatus for cleaning a surface of a photosensitive member, comprising:

a cleaning blade disposed in pressure contact with the surface of the photosensitive member;

a cleaning roller disposed on the upstream side of said cleaning blade with respect to the rotational direction of the photosensitive member, and being rotatable and movable laterally as to the rotational axis thereof under pressure contact with the surface of the photosensitive member;

a scraper disposed in pressure contact with the surface of the cleaning roller;



a single drive source to supply driving power;

a first transmission means for transmitting the driving power of said single drive source to said cleaning roller to rotate the same; and

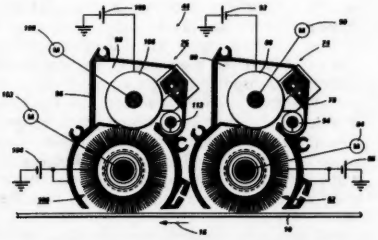
a second transmission means for transmitting the driving power of said single drive source to said cleaning roller to move the same laterally, whereby the cleaning roller and the scraper are moved relative to each other.

4,999,679

CLEANING APPARATUS WITH HOUSING AND BRUSH BIASED TO THE SAME MAGNITUDE AND POLARITY

Robert W. Corbin, Ontario; William E. Detwiler, Fairport, and Steven E. Kolb, Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 4, 1989, Ser. No. 445,246
Int. Cl.[5] G03G *21/00*
U.S. Cl. 355—303 **1 Claim**



1. An electrophotographic printing machine of the type having residual charged particles of opposite polarities adhering to a photoconductive member, wherein the improvement includes:

a first cleaning unit comprising a first housing defining a chamber, a first brush, positioned at least partially in the chamber of said first housing, having a multiplicity of conductive fibers extending outwardly therefrom, first brush biasing means for electrically biasing said first brush to a first magnitude and first polarity to remove particles having one polarity from the photoconductive member, said first brush biasing means electrically biasing said first housing to the same magnitude and polarity as said first brush, a first detoning roll positioned adjacent said first brush in the chamber of said first housing, and first roll biasing means for electrically biasing said first detoning roll to a magnitude and polarity sufficient to attract the particles having the one polarity from the conductive fibers of said first brush to said first detoning roll; and

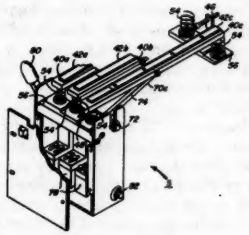
a second cleaning unit, adjacent said first cleaning unit, comprising a second housing defining a chamber, a second brush, positioned at least partially in the chamber of said second housing, having a multiplicity of conductive fibers extending outwardly therefrom, second brush biasing means for electrically biasing said second brush to a second magnitude and second polarity, opposite in polarity to the first polarity, to remove particles having the other polarity from the photoconductive member, said second brush biasing means electrically biasing said second housing to the same magnitude and polarity as said second brush, a second detoning roll positioned adjacent said second brush in the chamber of said second housing, and second roll biasing means for electrically biasing said second detoning roll to a magnitude and polarity sufficient to attract the particles having the the other polarity from the conductive fibers of said second brush to said second detoning roll.

4,999,680

SUPPORT ASSEMBLY FOR MULTIPLE DEVELOPMENT STATIONS IN AN ELECTROSTATOGRAPHIC REPRODUCTION APPARATUS

Brian J. Joseph; Thomas W. Mort; Philip A. Stern, all of Rochester, and Robert M. Westcott, Brockport, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 11, 1989, Ser. No. 336,391
Int. Cl.[5] G03G *15/01*
U.S. Cl. 355—326 **7 Claims**



1. In an electrostatographic reproduction apparatus having a plurality of development stations respectively containing different color marking particles for selective development of a plurality of latent image-wise charge patterns on a moving dielectric member, so that such apparatus is capable of making multi-color reproductions, a support assembly for said development stations, said support assembly comprising:

a plurality of members adapted to receive said plurality of development stations respectively, said plurality of members respectively including an elongated slide substantially parallel to said dielectric member and extending in a direction transverse to the direction of movement of said dielectric member;

means for simultaneously moving said elongated slides to a

first position where development stations received on said elongated slides are remote from said dielectric member to facilitate removal of such development stations from said apparatus, and to a second position where such development stations are in juxtaposition with said dielectric member, said simultaneous moving means including a plurality of pairs of springs associated with said elongated slides respectively to act on said slides adjacent to the ends thereof, and a linkage coupled to each of said elongated slides at substantially the mid-point thereof so that, upon movement of said elongated slides by said linkage, said elongated slides remain substantially parallel to said dielectric member; and

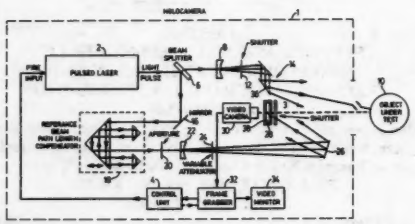
means for independently moving said elongated slides, once in said second position where development stations received on said elongated slides are located to bring marking particles into development contact with said dielectric member, to a third position where such development stations are located to prevent marking particles from coming into contact with said dielectric member.

4,999,681

REAL-TIME HALOGRAPHIC INTERFEROMETRY WITH A PULSED LASER AND FLICKER-FREE VIEWING

David L. Mader, 1294 Islington Ave., Apt. 704, Islington, Ontario, Canada M9A 3K2

Filed Jun. 24, 1988, Ser. No. 211,439
Int. Cl.[5] G01B *9/02*
U.S. Cl. 356—347 **10 Claims**



1. A method of holographic interferometry, wherein successive wavefronts reflected from an object are produced by successive pulses of substantially coherent light from a pulsed laser, one of said wavefronts is stored as an exposed and developed hologram, that wavefront is successively reconstructed from the hologram by subsequent pulses of light from the same pulsed laser, each reconstructed wavefront is combined with a second wavefront produced by reflection of the same pulse directly from the object, the combined wavefronts are sensed by a video camera focused on the object and converted into electrical signals, the electrical signals are stored by a video frame grabber synchronized with the laser pulses, and a video monitor driven by the frame grabber provides continuously refreshed views of fringes produced by interference between the wavefronts.

4,999,682

ELECTRONIC AND OPTOELECTRONIC LASER DEVICES UTILIZING LIGHT HOLE PROPERTIES

Jingming Xu, Toronto, Canada; Michael Shur, Golden Valley, Minn., and Mark Sweeny, Ossining, N.Y., assignors to Regents of the University of Minnesota, St. Paul, Minn.

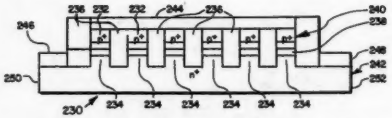
Division of Ser. No. 363,367, May 31, 1989, Pat. No. 4,899,201, which is a continuation of Ser. No. 85,908, Aug. 14, 1987, abandoned. This application Dec. 26, 1989, Ser. No. 456,507
Int. Cl.[5] H01L *27/12*
U.S. Cl. 357—4 **3 Claims**

1. A radiation emitting semiconductor device comprising:

an n-type body having a surface and a first end spaced apart from a second end;

a first contact electrically connected to the first end of the n-type body;

a second contact electrically connected to the second end of the n-type body;



a plurality of generally parallel p-type conductive strips which are generally parallel to the surface of the n-type body and extend in a direction generally perpendicular to a direction from the first contact to the second contact; and

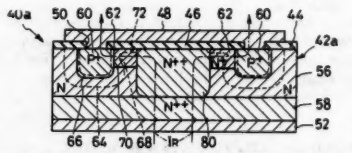
a third contact electrically connected to the plurality of generally parallel p-type conductive strips.

4,999,683

AVALANCHE BREAKDOWN SEMICONDUCTOR DEVICE

Akio Kiyomura, Sakado; Takayoshi Terashima, Saitama, and Tohru Suzuki, Asaka, all of Japan, assignors to Sanken Electric Co., Ltd., Saitama, Japan

Filed Dec. 28, 1989, Ser. No. 458,398
Claims priority, application Japan, Dec. 30, 1988, 63-333952; Aug. 11, 1989, 1-208900
Int. Cl.[5] H01L *29/90, 29/06, 29/34*
U.S. Cl. 357—13 **11 Claims**



1. An avalanche breakdown semiconductor device comprising:

(a) a semiconductor substrate **[42]** having a main face **[44]** and comprising:

(1) a first region **[56]** of a first conductivity type partly exposed at the main face of the semiconductor substrate;

(2) a second region **[60]** of a second conductivity type, opposite to the first conductivity type, exposed at the main face of the semiconductor substrate and disposed contiguous to the first region; and

(3) at least one third region **[62]** of the first conductivity type exposed at the main face of the semiconductor substrate and disposed contiguous to both the first and second regions so that the second and third regions provide therebetween a pn junction which is exposed at the main face of the semiconductor substrate, the third region being surrounded by the second region, as seen at the main face of the semiconductor substrate, and being higher in impurity concentration than the first region;

(b) an insulating layer **[46]** formed on the main face of the semiconductor substrate so as to cover the pn junction between the second and third regions and substantially all the surface of the third region exposed at the main face of the semiconductor substrate;

(c) a first electrode **[48]** formed on the main surface of the insulating layer so as to cover substantially all the exposed

surface of the third region of the semiconductor substrate via the insulating layer and electrically connected to the second region of the semiconductor substrate; and

(d) a second electrode [52] formed on the face opposite to the main face of the semiconductor substrate and electrically connected to the first region thereof.

4,999,684

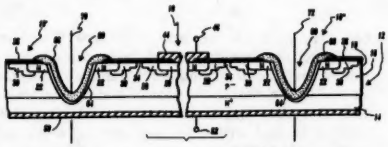
SYMMETRICAL BLOCKING HIGH VOLTAGE BREAKDOWN SEMICONDUCOTR DEVICE

Victor A. K. Temple, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 190,903, May 6, 1988. This application Nov. 13, 1989, Ser. No. 435,632

Int. Cl.[5] H01L *29/90, 29/40*

U.S. Cl. 357—13 13 Claims



1. A symmetrical blocking high breakdown voltage semiconductor device comprising a semiconductor substrate of a first conductivity type; an epitaxial layer of a second conductivity type disposed on the substrate; a main region of the first conductivity type extending into said epitaxial layer from an upper surface thereof; a secondary region of the first conductivity type extending into said epitaxial layer from the upper surface thereof and surrounding the main region, said secondary region being spaced from said main region and having a sloped sidewall surface; said sloped sidewall surface extending from the upper surface of said epitaxial layer through the secondary region and the epitaxial layer and into the substrate; the main and secondary regions forming respective PN junctions with the epitaxial layer; and a thin implanted layer of impurities of the first conductivity type in the sloped sidewall surface forming a low resistivity path for electrically connecting the secondary region to the substrate.

4,999,685

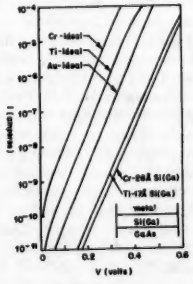
SCHOTIKY BARRIER HEIGHT FOR METAL CONTACTS TO III-V SEMICONDUCTOR COMPOUNDS

James R. Waldrop, and Ronald W. Grant, both of Thousand Oaks, Calif., assignors to United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 16, 1989, Ser. No. 353,271

Int. Cl.[5] H01L *29/48, 29/161, 29/80*

U.S. Cl. 357—15 8 Claims



1. In a semiconductor device, said semiconductor device having a base layer, a contact to said base layer having a Schottky barrier height about 1 eV, said contact comprising:

a metallic layer;

an interface layer, said interface layer having said metallic layer deposited thereon, said interface layer being composed of a Group IV element heavily doped p-type; and

a III–V compound base layer.

4,999,686

SEMICONDUCTOR DEVICE COMPRISING AN INTEGRATED OPTICAL GUIDE, WHICH HAS AT LEAST ONE RECTILINEAR PART AND ONE CURVED PART

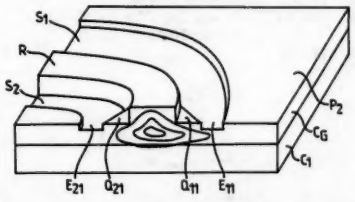
Philippe Autier; Marko Erman, both of Paris, and Jean-Marc Auger, Joinville-Le-Pont, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jun. 6, 1989, Ser. No. 362,726

Claims priority, application France, Jun. 24, 1988, 88 08503

Int. Cl.[5] H01L *29/161*

U.S. Cl. 357—16 22 Claims



1. A semiconductor device, comprising: an integrated optical guide, which has at least one rectilinear part and one curved part, and means for confining light in the guide in the curved part, the means for confining comprising

a groove provided along an edge of the guide in the region of the curved part,

a guiding layer and, overlying said guiding layer, a guiding ribbon in relief for determining the optical path followed by the light in the guiding layer, and

the groove having a constant depth, a central part which exactly follows the edge of the guiding ribbon in the curved part, ends which diverge from the edge of said ribbon at the beginning and at the end of the curved part, and a bottom disposed in the guiding layer at a level which does not reach the lower part of said guiding layer.

4,999,687

LOGIC ELEMENT AND ARTICLE COMPRISING THE ELEMENT

Sergey Luryi, Bridgewater, and Mark R. Pinto, Morristown, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

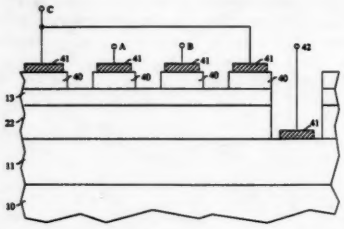
Filed Apr. 25, 1990, Ser. No. 514,078

Int. Cl.[5] H01L *29/161*

U.S. Cl. 357—16 10 Claims

1. An article comprising an electronic logic element comprising input terminals and an output terminal, associated with each input terminal and the output terminal being a first and a second electrical condition (to be termed logic 0 and logic 1,

respectively), CHARACTERIZED IN THAT the logic element comprises at least two input terminals and is a logic



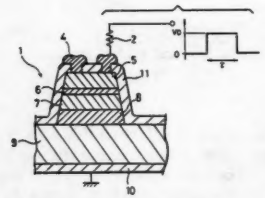
element other than a NOT element, wherein the logic element contains a single active electronic device.

4,999,688

OPTICAL LOGIC ELEMENT WITH SHORT SWITCHING TIME

Kunihiko Hara; Keisuke Kojima, and Kazuo Kyuma, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jan. 6, 1990, Ser. No. 475,994
Claims priority, application Japan, Feb. 17, 1989, 1-38696; Jul. 10, 1989, 1-177823; Aug. 18, 1989, 1-213841
Int. Cl.[5] H01L *31/12*
U.S. Cl. 357—19 9 Claims



1. An optical logic element comprising:
an optical bistable element for switching from a high resistance state to a low resistance state in response to incident light energy in which the switching time becomes shorter as the incident light energy becomes larger; and
said optical logic element achieving analog threshold processing of said light energy by making the operation time range of said optical bistable element a finite value.

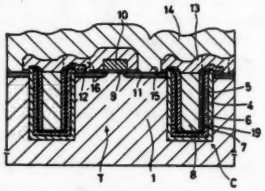
4,999,689

SEMICONDUCTOR MEMORY

Katsuji Iguchi, Yamatokoriyama; Masahiko Urai, Nara, and Chiyako Masuichi, Toyonaka, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 267,335, Nov. 4, 1988, abandoned. This application Aug. 13, 1990, Ser. No. 566,866
Claims priority, application Japan, Nov. 6, 1987, 62-281382
Int. Cl.[5] H01L *29/68*
U.S. Cl. 357—23.6 16 Claims

1. A semiconductor memory having a plurality of memory cells comprising:
a semiconductor substrate;
a plurality of capacitor and transistor pairs corresponding to each of said memory cells, each of said pairs being capable of storing one bit;
a common wiring bus formed from an alloy of a first material and disposed on said substrate for commonly connecting the source terminals of said transistors; and
a plurality of trenches formed by a groove-like shape along an outer periphery of one or two adjacent transistor for receiving said capacitors, each of said capacitors including,
a first insulating film disposed on an inner wall surface and a bottom surface of each of said trenches,
a plate electrode formed on the top surface of said first insulating film for applying a predetermined voltage,
a second insulating film disposed over the surface of said plate electrode,



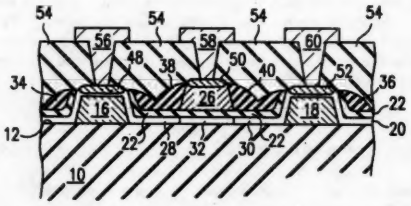
a capacitor electrode disposed on an area of said second insulating film and connected to the drain terminal of one of said one or two adjacent transistor by said alloy of said first material, the area of said second insulating film corresponding to an area on said inner sidewall surface of said trench and an area on a top surface outside said trench, and
a third insulating film disposed on said capacitor electrode and said second insulating film.

4,999,690

TRANSISTOR

Mark S. Rodder, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 19, 1989, Ser. No. 452,855
Int. Cl.[5] H01L *27/01, 45/00, 27/12*
U.S. Cl. 357—23.7 34 Claims



1. A transistor disposed on a surface of a substrate, comprising:
first and second conductive bodies spaced apart and disposed on the surface;
a channel layer having a center portion and first and second side portions separated by said center portion, said first and second side portions respectively electrically coupled to said first and second conductive bodies, said center portion of said channel layer covering the surface between said first and second conductive bodies, said first and second side portions respectively covering said first and second conductive bodies such that said first and second conductive bodies are disposed between the surface and said first and second side portions, respectively;
a gate insulator layer disposed outwardly from said channel layer between said first and second conductive bodies such that said channel layer is disposed between said gate insulator layer and the surface; and
a gate conductor disposed outwardly from said gate insulator layer such that said gate insulator layer is disposed between said gate conductor and said channel layer, said gate conductor operable to electrically actuate a portion of said channel layer proximate said gate conductor.

4,999,691

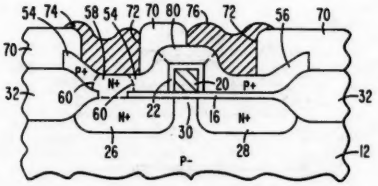
INTEGRATED CIRCUIT WITH STACKED MOS FIELD EFECT TRANSISTORS

Sheng T. Hsu, West Windsor Township, Mercer County, and Doris W. Flatley, Hillsborough Township, Somerset County, both of N.J., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 137,544, Dec. 23, 1987, abandoned, which is a continuation of Ser. No. 769,146, Aug. 26, 1985, abandoned. This application Dec. 22, 1989, Ser. No. 453,090

Int. Cl.[5] H01L *27/092, 29/04*

U.S. Cl. 357—23.7 6 Claims



1. In an integrated circuit device including a body of semiconducting material of a first conductivity type having a planar surface, a pair of MOS field effect transistors (MOSFETs) having a common gate comprising:

(a) highly doped first and second regions of second conductivity type disposed in said body and extending inwardly from said planar surface and being spaced to define a first channel having a length therebetween;

(b) a layer of silicon oxide disposed on said planar surface over said first and second regions and said channel, said layer having an opening over said first region;

(c) a layer of silicon having the same conductivity type as said first region disposed on said layer of silicon oxide over said first and second regions and said channel;

(d) highly doped third and fourth regions of first conductivity type disposed in said layer of silicon and extending to said layer of silicon oxide and being spaced to define a second channel therebetween, said second channel being substantially opposite said first channel, said third region including a highly doped fifth region of the same conductivity type as that of said first region, being in electrical communication therewith through said opening and in PN junction forming relation with said third region;

(e) a gate disposed between said body and said layer of silicon in substantial alignment with said first and second channels, and being insulated from said body and from said silicon layer, and having a length substantially the same as that of said first channel; and

(f) a conducting layer contacting both of said first and third regions,

wherein said first and third regions are in mutual ohmic contact.

4,999,692

SEMICONDUCTOR MAGNETIC FIELD SENSOR

Ljubisa Ristic, Edmonton, Canada; Heinrich P. Baltes, Zürich, Switzerland, and Thomas Smy, Edmonton, Canada, assignors to The Governors of the University of Alberta, Edmonton, Canada

Filed May 11, 1988, Ser. No. 192,770

Claims priority, application United Kingdom, May 12, 1987, 8711150

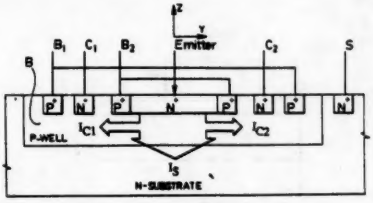
Int. Cl.[5] H01L *27/22*

U.S. Cl. 357—27 14 Claims

13. Means for injecting minority carriers along an injection axis into a semiconductor conduction region, comprising:

an injection region forming a junction with the conduction region, the junction being formed about the injection axis;

injection suppressing regions on at least laterally opposing sides of the injection region and forming junctions with the injection region having depletion zones, the injection region suppressing injection of minority carriers laterally relative to the injection axis:



means for reverse biasing the junctions between the injection region and the injection suppressing regions to varying degrees such that the injection of minority carriers can be focused along the injection axis to varying degrees.

4,999,693

PHOTOELECTRIC CONVERSION DEVICE WITH A HIGH RESPONSE SPEED

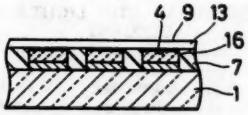
Shunpei Yamazaki, Tokyo; Akira Mase, and Toshiji Hamatani, both of Atsugi, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Atsugi, Japan

Filed Jan. 6, 1987, Ser. No. 851

Claims priority, application Japan, Jan. 6, 1986, 61-1008; Jan. 6, 1986, 61-1009; Mar. 31, 1986, 61-73746

Int. Cl.[5] H01L *27/14, 31/06*

U.S. Cl. 357—30 15 Claims



1. A photosensor array comprising:

a plurality of first electrodes;

a plurality of photosensitive blocks having first and second opposed surfaces, said blocks being arranged in an array formed respectively at said first electrodes such that said first surfaces of the photosensitive blocks respectively contact the first electrodes;

an organic insulating material provided filling the spaces between said photosensitive blocks in order to form a first surface of the organic insulating material flush with the second surfaces of said photosensitive blocks; and

a common electrode formed adjacent the first surface of said organic insulating material and said second surface of the photosensitive blocks in order that each photosensitive block constitutes an independent photosensor operative with a corresponding one of said first electrodes and said common electrode.

4,999,694

PHOTODIODE

Richard F. Austin, Fair Haven; Robert D. Feldman, Red Bank; James W. Sulhoff, Ocean, and John L. Zyskind, Shrewsbury, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 18, 1989, Ser. No. 395,922

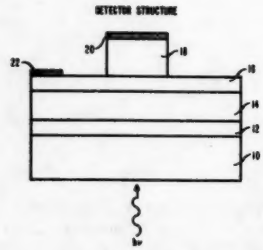
Int. Cl.[5] H01L *27/14, 31/00*

U.S. Cl. 357—30 2 Claims

1. A photovoltaic detector with a planar structure having a first buffer layer of semi insulating ZnTe,

a second buffer layer of semi insulating CdTe located above said first buffer layer,

an substrate of GaAs located below said first buffer layer, p1 an epitaxial semiconductor semimetal Schottky type of photodiode having an isotype heterojunction located above said second buffer layer, and



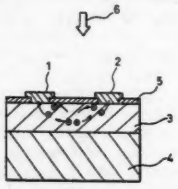
first and second contacts coupled to said epitaxial semiconductor semimetal Schottly type of photodiode to provide a diode.

4,999,695

MSM TYPE SEMICONDUCTOR LIGHT RESPONSIVE ELEMENT

Tetsuo Shiba, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Jul. 24, 1989, Ser. No. 383,618
Claims priority, application Japan, Aug. 5, 1988, 63-196837
Int. Cl.[5] H01L *27/14, 31/00*
U.S. Cl. 357—30 **7 Claims**



1. An MSM semiconductor light responsive element comprising:

a semiconductor substrate;

a first semiconductor layer disposed on said substrate and having a first surface opposite the substrate;

a second semiconductor layer having a larger energy band gap than that of said first semiconductor layer disposed on said first surface, having a second surface opposite said first surface, and including first and second openings extending to said first semiconductor layer; and

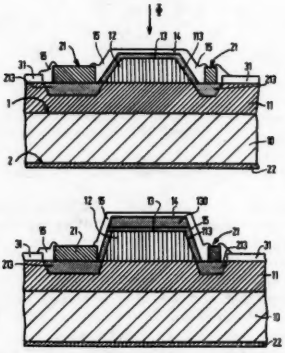
first and second Schottky barrier electrodes disposed in and filling the first and second the openings, respectively, each electrode contacting and forming a Schottky barrier with said first semiconductor layer wherein each electrode is partially disposed on the second surface of said second semiconductor layer so that the first and second electrodes are closer to each other on the second surface than in the openings and on said first surface.

4,999,696

PIN PHOTODIODE HAVING A LOW LEAKAGE CURRENT

Jean-Louis Gentner, Saint-Maur; Jean-Noël Patillon, Paris; Catherine Mallet-Mouko, Boissy-Saint-Leger, and Gérard Martin, Paris, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 855,234, Apr. 24, 1986, abandoned.
This application Jan. 17, 1989, Ser. No. 298,201
Claims priority, application France, May 3, 1985, 85 06753
Int. Cl.[5] H01L *29/205, 31/06*
U.S. Cl. 357—30 **3 Claims**



1. A PIN photodiode having a low leakage current for improved optical use comprising

a substrate of indium phosphide of an n+ type conductivity,

a layer of indium phosphide of an n− type conductivity on a first surface of said substrate,

a MESA structure of a layer of gallium indium arsenide of an n− type conductivity, said MESA structure being disposed on said layer of indium phosphide, said layer of indium phosphide having a lower n− type doping concentration than the n- type doping concentration of said gallium indium arsenide of said MESA structure,

a p+ layer of gallium indium arsenide on the top surface and side surfaces of said MESA structure,

a p+ layer of indium phosphide in said layer of indium phosphide at a surrounding circumferential surface to said MESA structure,

an ohmic contact on a part of said p+ indium phosphide layer in said n- type layer of indium phosphide, said ohmic contact being separated from said MESA structure, and said ohmic contact extending around said MESA structure, and

a metallic contact disposed on a second surface of said substrate opposite to said first surface,

wherein said p+ layer of gallium indium arsenide on said top surface of said MESA structure has a smaller thickness than said p+ layer of indium phosphide in said n-type layer of indium phosphide thereby increasing efficiency of said photodiode, and

wherein said layer of indium phosphide of said n- conductivity type on said substrate has a thickness of about 3 μm, and said layer of gallium indium arsenide of said n- conductivity type of said MESA structure has a thickness of about 3 μm, wherein said n- type layer of indium phosphide has an n- doping of the order of 2×10^{14} charge carriers per cm^3, and said n- type layer of gallium indium arsenide in said MESA structure has a doping of the order of 1 to 2×10^{15} charge carriers per cm^3, and wherein said p+ layer of indium phosphide in said n- type layer of indium phosphide has a thickness of at least 0.5 μm, and said p+ layer of gallium indium arsenide on said top

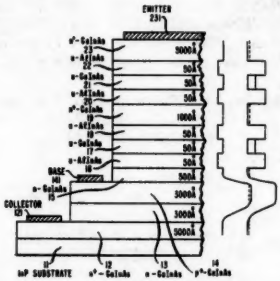
surface of said MESA structure has a thickness ranging from about 0.1 to 0.2 μm.

4,999,697

SEQUENTIAL-QUENCHING RESONANT-TUNNELING TRANSISTOR

Federico Capasso, Westfield; Alfred Y. Cho, Summit, and Susanta Sen, Scotch Plains, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 14, 1988, Ser. No. 244,753
Int. Cl.[5] H01L *29/72*
U.S. Cl. 357—34 9 Claims



1. A semiconductor device comprising:

an emitter region having a first conductivity type and a first composition and bandgap profile;

a base region having a second conductivity type and a second composition and bandgap profile;

a collector region having said first conductivity type and having a third composition and bandgap profile;

first, second, and third electrical contacts to said emitter, base and collector regions, respectively:

a plurality of quantum wells between said base region and said electrical contact to said emitter region,

at least two of said quantum wells being separated such that there is no significant quantum-mechanical interaction between the quantum-mechanical states of two quantum wells, and such that, during intended device operation, quenching of resonant tunneling through said quantum wells occurs at different base-emitter voltages; and

means for inhibiting back-injection of minority carriers from said base region to said emitter region during device operation.

4,999,698

INTERCONNECTION ARRANGEMENT FOR A GATE ARRAY

Yoshihiro Okuno, and Yohichi Kuramitsu, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

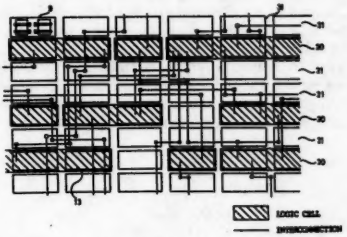
Filed Aug. 16, 1989, Ser. No. 394,329
Claims priority, application Japan, Aug. 18, 1988, 63-205571
Int. Cl.[5] H01L *27/10*
U.S. Cl. 357—45 20 Claims

1. A gate array, comprising:

a substrate having a major surface (1);

a plurality of basic cells (9) each having a length greater than its width, said cells aligned with each other longitudinally and arranged continuously on said major surface of said substrate (1) in rows;

interconnection channels (21) having said width formed selectively between said cells and extending in the direction of said rows; and



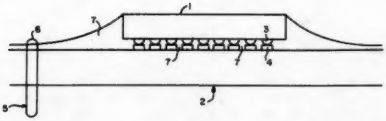
interconnection wiring (16) in said channels and extending in the direction of said rows for interconnecting selected ones of said cells.

4,999,699

SOLDER INTERCONNECTION STRUCTURE AND PROCESS FOR MAKING

Frederick R. Christie; Kostas I. Papathomas, both of Endicott, and David W. Wang, Vestal, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 14, 1990, Ser. No. 493,126
Int. Cl.[5] H01L *23/48, 29/40, 29/64, 39/02*
U.S. Cl. 357—65 21 Claims



1. A solder interconnection for forming connections between an integrated semiconductor device and a carrier substrate comprising

a plurality of solder connections that extend from the carrier substrate to electrodes on said semiconductor device to form a gap between said carrier substrate and the semiconductor device, wherein said gap is filled with a composition obtained from curing a composition containing:

A. a binder selected from the group of cycloaliphatic polyepoxide, cyanate ester, prepolymer of cyanate ester and mixtures thereof, said binder having a viscosity at room temperature of no greater than about 1,000 centipoise;

B. filler having a maximum particle size of 31 microns and being substantially free of alpha particle emissions; wherein the amount of A is about 60 to about 25% by weight of the total of A and B and correspondingly, the amount of B is about 40 to about 75 percent by weight based upon the amount of A and B.

4,999,700

PACKAGE TO BOARD VARIABLE PITCH TAB

Thomas J. Dunaway, St. Louis Park; Richard K. Spielberger, Maple Grove, and James M. Poplett, Plymouth, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Apr. 20, 1989, Ser. No. 341,638
Int. Cl.[5] H01L *23/48, 23/52*
U.S. Cl. 357—70 2 Claims

1. A variable pitch tab leadframe assembly for use in connecting a semiconductor chip package bond sites to a next-level-of-packaging bond sites, the leadframe comprising:

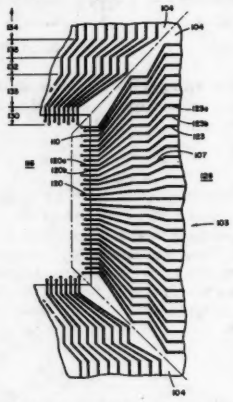
(a) tape carrier material;

(b) a plurality of patterned conductive elements adjacently

arranged on the tape carrier material in a plurality of sections, comprising:

(i) a first section, a second section, and a third section, each section comprising adjacent conductive elements arranged in parallel and arranged with a pitch spacing that is different than the pitch spacing of the element in the other two sections; and

(ii) a fourth section providing connection between the first section and the second section, and a fifth section providing connection between the second section and the third section, so that adjacent conductive elements in



each of the fourth and fifth sections are positioned in a non-parallel relation; and

(c) each conductive element comprising first end portion means located in the first section for connection to a semiconductor chip package bond site and second end portion means located in either the second or third section for connection to a next-level-of-packaging bond site;

(d) whereby the variable pitch tab leadframe assembly permits bonded electrical connection of the conductive elements between semiconductor chip package bond sites and one of a plurality of differently-pitched next-level-of-packaging bond sites.

4,999,701

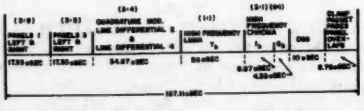
HIGH DEFINITION NTSC COMPATIBLE TELEVISION SYSTEM WITH INCREASED HORIZONTAL BANDWIDTH AND REDUCED COLOR ARTIFACTS

Alan P. Cavallerano, Ossining; Mikhail Tsinberg, Riverdale, and Karl Wittig, New York, all of N.Y., assignors to North American Philips Corporation, New York, N.Y.

Continuation of Ser. No. 122,148, Nov. 17, 1987, abandoned. This application Jul. 10, 1989, Ser. No. 377,780

Int. Cl.[5] H04N *11/00, 7/06*

U.S. Cl. 358—12 **19 Claims**



15. A high definition television television system wherein a first signal and a second signal are derived from a high definition television signal and wherein said first and second signals are transmitted separately and can be received and combined to provide a high definition television display, said system comprising:

means for deriving as said first signal a conventional television signal which can be directly received by and viewed as a conventional television display on a conventional television receiver;

means for deriving a plurality of enhancement signals which can be combined with said conventional television signal to provide a high definition television display having horizontal and vertical resolution which is higher than that of said conventional television display; and

means for time multiplexing said enhancement signals with an audio signal to form said second signal, said second signal having a line interval which is greater than a standard television line interval.

4,999,702

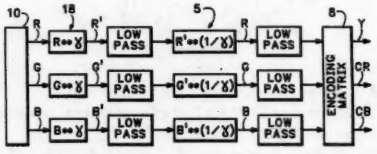
METHOD AND APPARATUS FOR PROCESSING COMPONENT SIGNALS TO PRESERVE HIGH FREQUENCY INTENSITY INFORMATION

David L. Knierim, Wilsonville, and Gary L. Brown, Lake Oswego, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Division of Ser. No. 334,829, Apr. 7, 1989. This application Dec. 26, 1989, Ser. No. 457,062

Int. Cl.[5] H04N *9/64*

U.S. Cl. 358—32 **5 Claims**



1. A method for processing a video signal in GAMMA-corrected color component form having a selected bandwidth, comprising removing the GAMMA correction to provide linear color component signals, limiting the bandwidth of the linear color component signals to a value less than the selected bandwidth to provide bandwidth-limited color component signals, and GAMMA correcting the bandwidth-limited component signals to provide GAMMA-corrected color component signals.

4,999,703

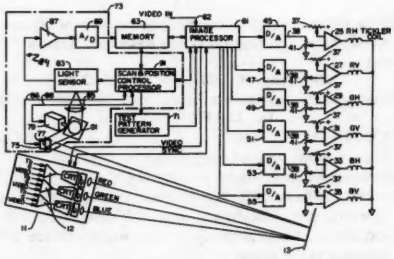
AUTOMATIC IMAGE CORRECTION METHOD AND APPARATUS FOR PROJECTORS UTILIZING CATHODE RAY TUBES

Alan R. Henderson, Carlsbad, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 23, 1988, Ser. No. 290,017

Int. Cl.[5] H04N *9/31*

U.S. Cl. 358—60 **12 Claims**



1. Apparatus for use in automatically correcting misconver-

gence of color images controlled by a plurality of cathode ray tubes (CRT's), the CRT's and their respective images being used in a color projector for creating a display on a projector screen in response to signals supplied to said projector, said CRT's including adjustment means responsive to correction signals for adjusting the position of said images, said apparatus comprising:

means for supplying said projector with an identical test pattern signal for each respective CRT, causing projection on said projector screen of a respective test pattern for each CRT;

means for detecting the difference in position between said respective test patterns at each of a plurality of locations on said screen and storing said differences for use in correcting said misconvergence, wherein said means for detecting comprises;

sensor means for producing a detection signal each time a portion of one of said test patterns is scanned across said sensor means;

scanning means for successively scanning an image of each of said plurality of locations across said sensor means and for generating a positional signal representing the position on said screen of a location scanned across said sensor means; and

means for storing position values indicative of the position represented by said positional signal in response to production of said detection signal by said sensor means; and

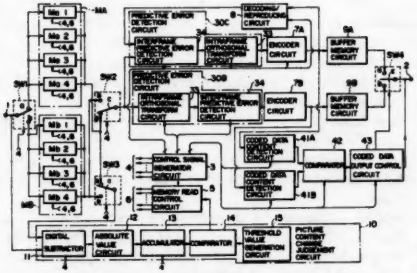
image processor means for processing said position values to generate correction values for said CRT's and for storing said correction values in said storing means; wherein said image processor means is further supplied with the output of said test pattern generator means and adds sync signals to said test pattern signals and translates the levels of said test pattern signals.

4,999,704

SYSTEM FOR EFFICIENTLY CODING A MOVING-PICTURE SIGNAL, CAPABLE OF SELECTING SEVERAL DIFFERENT CODING SYSTEMS

Ichiro Ando, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Dec. 22, 1989, Ser. No. 453,306
Claims priority, application Japan, Dec. 26, 1988, 63-326282
Int. Cl.[5] H04N 7/12
U.S. Cl. 358—133 **13 Claims**



1. An efficient coding system comprising:

partition means for partitioning picture signals corresponding to successive frames into picture signals corresponding to individual frame groups comprised of a predetermined number of frames;

change amount detection means for detecting an amount of change of the picture content between two adjacent frames with respect to said picture signals of every individual frame group;

judgment means for judging whether or not the amount of change of the picture content exceeds a predetermined value;

signal generating means for generating a picture signal corresponding to any of first and second replacement states, wherein said first replacement state is a state defined as a second frame, which is the latter frame of said two adjacent frames, and all other frames subsequent thereto and to the last frame of a group of frames, are replaced with a first frame, which is the former frame of said two adjacent frames, and said second replacement state being a state defined as all frames from a leading frame of said one group of frames to said first frame being replaced with said second frame when said change of the picture content is judged to exceed said predetermined value;

error detection means for detecting a predictive error of said picture signal generated by said signal generating means; and

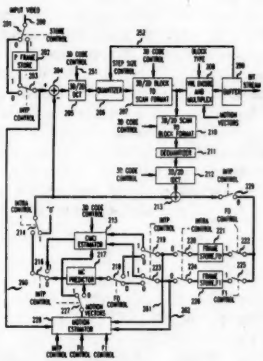
coding means for coding said predictive error obtained by said error detection means.

4,999,705

THREE DIMENSIONAL MOTION COMPENSATED VIDEO CODING

Atul Puri, New York, N.Y., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 3, 1990, Ser. No. 518,677
Int. Cl.[5] H04N 7/13
U.S. Cl. 358—136 **21 Claims**



1. A method of encoding a signal representing the actual intensity values of picture elements (pels) in a series of frames, comprising the steps of

(i) computing estimates of the values of pels in at least two intermediate frames which lie between reference frames, based on the values of pels in at least one of said reference frames;

(ii) combining error values for corresponding blocks of pels in each of said intermediate frames to form a series of transform coefficients representing said error values, each of said error values representing the difference between said estimated value and said actual value of said pel, and

(iii) selecting ones of said coefficients for further processing based upon the significance of information represented by said coefficients,

wherein said selection step includes

(a) grouping said coefficients into a plurality of groups each containing coefficients having approximately the same significance, and

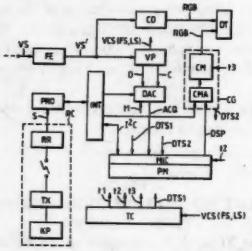
(b) selecting all coefficients from only selected ones of said groups.

4,999,706

TELETEXT DECODERS WITH INHIBIT MEANS FOR PRECLUDING OVER-WRITING CODES IN PAGE MEMORY

John R. Kinghorn, Ashtead, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 5, 1989, Ser. No. 418,356
Claims priority, application United Kingdom, Oct. 5, 1988, 8823370
Int. Cl.[5] H04N 7/08
U.S. Cl. 358—147 16 Claims



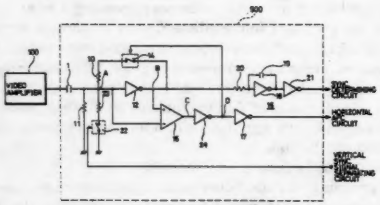
1. A teletext decoder for teletext information comprising pages which are transmitted in a recurrent cycle; said teletext decoder including means for selecting a page, an acquisition circuit for acquiring digital codes representing the teletext information for the selected page on each occurrence thereof in the recurrent cycle of pages, a page memory for storing the acquired digital codes at individual page memory locations, addressing means for addressing the page memory locations, and writing means for writing the acquired digital codes into the page memory locations when they are addressed; and said teletext decoder being characterised by further including detection means for detecting the presence in an addressed page memory location of any one of a number of selected digital codes, and inhibiting means responsive to the detection of such a selected digital code to prevent the over-writing of that code by a subsequently acquired digital code which would otherwise have been written into the addressed page memory location.

4,999,707

SYNCHRONIZING SIGNAL SEPARATING CIRCUIT SEPARATING SYNCHRONIZING SIGNAL FROM A COMPOSITE VIDEO SIGNAL

Yoshichika Hirao, Osaka; Nobukazu Hosoya, Nara; Takaaki Ishii, Osaka, and Tadashi Amino, Hyogo, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Mar. 29, 1990, Ser. No. 500,981
Claims priority, application Japan, Mar. 31, 1989, 1-83219
Int. Cl.[5] H04N 5/08
U.S. Cl. 358—153 14 Claims



1. A synchronizing signal separating circuit for separating, from an input signal including at least a synchronizing signal, said synchronizing signal, comprising:

coupling capacitance means (1) for receiving said input signal,

first inverting and amplifying means (12) for inverting and amplifying said input signal received through said coupling capacitance means,

first limiter means (13) for limiting an amplitude of an output signal of said first inverting and amplifying means to supply said output signal having its amplitude limited as said synchronizing signal,

first bias means (10) for connecting an output node (B) to an input node (A) of said first inverting and amplifying means for charging said coupling capacitance means with the output signal of said first inverting and amplifying means,

first switching means (14) provided between the output node of said first inverting and amplifying means and said first bias means and being controlled so as to be turned on in said synchronizing signal period in response to the output signal of said first limiter means and,

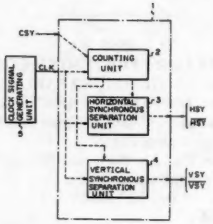
second bias means connected between the input node of said first inverting and amplifying means and a fixed reference potential for discharging electric charges of said coupling capacitance means.

4,999,708

SYNCHRONOUS SEPARATION CIRCUIT

Tetsuo Aoki, Kawasaki, and Fumitaka Asami, Kunitachi, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jan. 23, 1989, Ser. No. 299,534
Claims priority, application Japan, Jan. 22, 1988, 63-013116
Int. Cl.[5] H04N 5/08, 5/10
U.S. Cl. 358—153 3 Claims



1. A synchronous separation circuit used in a television video circuit for generating a horizontal synchronizing signal and a vertical synchronizing signal from a composite synchronizing signal comprising:

a clock signal generating circuit for generating said clock signal having a frequency higher than a frequency of said horizontal synchronizing signal;

a first frequency dividing circuit for receiving said clock signal and generating a first signal (S_{11}) by starting to count the clock signal from a leading edge of said composite synchronizing signal up to a first predetermined count number;

a second frequency dividing circuit for receiving said clock signal and generating a second signal (S_{21}) by starting to count the clock signal from a leading edge of said first signal up to a second predetermined count number larger than said first predetermined count number;

a first reset circuit for resetting said first frequency dividing circuit at every said first predetermined count number;

a second reset circuit for resetting said second frequency dividing circuit for outputting said horizontal synchronizing signal from said first and second signals; and

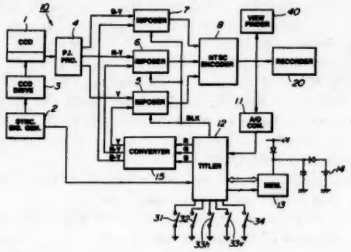
a latch circuit for latching said composite synchronizing signal in response to a trigger signal which is based on the first signal, thereby to separate said vertical synchronizing signal from said composite synchronizing signal.

4,999,709

APPARATUS FOR INSERTING TITLE PICTURES

Hiroshi Yamazaki, Kanagawa, and Sakae Okazaki, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jan. 19, 1989, Ser. No. 299,063
Claims priority, application Japan, Jan. 27, 1988, 63-14554
Int. Cl.[5] H04N 5/14; G09G 1/06
U.S. Cl. 358—160 28 Claims



1. Apparatus for superimposing graphic title image signals onto an input video signal, comprising:

addressable storage means for storing graphic title image data;

address generating means for generating timed address signals to read out the graphic title image data from said storage means;

image signal generating means for generating graphic title image signals from the graphic title image data read out from said storage means;

superimposing means for receiving said input video signal and said graphic title image signals to superimpose said graphic title image signals onto said video signal;

address control means coupled to said address generating means for establishing an effective image range of addresses;

shift means for shifting the addresses of the address signals generated by said address generating means by a predetermined number of addresses for every m repetition periods, wherein m is an integer and a repetition period is a selected one of either a vertical field interval or a vertical frame interval of a video signal; and

output means responsive to said effective image range of addresses and the shifted address signals to supply to said image signal generating means the read out graphic title image data from said storage means at intervals within said effective image range and determined by the shifted address signals, whereby a video picture derived from the supplied graphic title image data represents a graphic title image that shifts within said effective image range.

4,999,710

TELEVISION SIGNAL RECEIVING APPARATUS

Hitoshi Senso, and Hisashi Takaki, both of Tokyo, Japan, assignors to Pioneer Electric Corporation, Tokyo, Japan

Filed Dec. 19, 1988, Ser. No. 285,977
Claims priority, application Japan, Apr. 15, 1988, 63-92987; Apr. 15, 1988, 63-92988
Int. Cl.[5] H04N 5/14
U.S. Cl. 358—160 14 Claims

1. A television signal receiving apparatus comprising:

an A/D converter for converting an analog TV signal of a high definition system to a digital signal;

a memory for storing said digital signal at least one field at a time;

a vertical filter for converting a number of high definition TV signal horizontal scanning lines represented by at least a portion of said stored digital signal into a number of horizontal scanning lines of a TV signal of an NTSC system; and

a plurality of NTSC displays arranged in n rows, each of said plurality of NTSC displays driven by an NTSC signal having X lines per frame which include at least a portion of said converted horizontal scanning lines of said NTSC system TV signal;

wherein said vertical filter converts said high definition TV signal to a number of lines equal to Xn; and

wherein said vertical filter comprises:

means for generating one new horizontal scanning line by multiplying 7 successive horizontal scanning lines by corresponding coefficients and then adding the resultant lines;

means for changing the coefficients every horizontal period; and

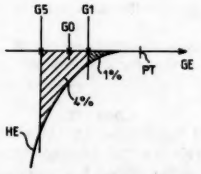
means for generating new horizontal scanning lines at the rate of 7 new lines of an NTSC TV signal per 5 lines of high definition TV signal.

4,999,711

DIGITAL METHOD OF MODIFYING AN IMAGE CONTRAST SO AS TO RETAIN IMAGING OF SMALL OBJECTS

Jacques Paulin, Sucy-en-Brie, France, assignor to U.S. Philips Corp., New York, N.Y.

Filed Jun. 26, 1989, Ser. No. 371,771
Claims priority, application France, Jul. 1, 1988, 88 08918
Int. Cl.[5] H04N 5/57
U.S. Cl. 358—169 7 Claims



1. A digital method of modifying an image to obtain an output image on the basis of an input image, each image being defined by a set of picture elements, denoted pixels hereinafter, each pixel containing at least a digital value defining its grey level among a set of possible values, said method comprising:

a first stage in which a histogram is established which is representative of the distribution in a percent figure of the grey levels of the pixels of said input image,

a second stage in which, on the basis of the distribution characteristics of said histogram a correspondence function is established between the input and output grey levels,

a third stage in which the output image is formed on the basis of the pixels of the input image and of said correspondence function,

said correspondence function consisting of clipping the pixels having extreme grey levels and of linearly re-distributing the grey levels of the remaining pixels, wherein clipping of the extreme grey level pixels is effected on the basis of an input grey level value which is specific for each image and is determined during the second stage, said input grey level value being chosen so as to provide that the grey level corresponds to a change in the significant slope of the curve of the established histogram, which change of slope is located between a predetermined first and a second accrued percentage figure.

4,999,712

PHOTOELECTRIC CONVERTING DEVICE FOR FORMING CHARGE LATENT IMAGE AND RECORDING SYSTEM THEREOF

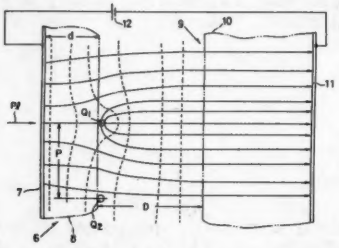
Itsuo Takanashi, Kamakura; Shintaro Nakagaki, Fujisawa; Hirohiko Shinonaga; Tsutou Asakura, both of Yokohama; Masato Furuya, and Tetsuji Suzuki, both of Yokosuka, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Feb. 9, 1990, Ser. No. 477,579

Claims priority, application Japan, Feb. 10, 1989, 64-31907

Int. Cl.[5] H04N *5/335, 1/23*

U.S. Cl. 358—213.11 **15 Claims**



1. A photoelectric conversion device for converting an electro-magnetic radiation beam incident thereto, into a charge pattern, said electro-magnetic radiation beam carrying information intended to be recorded, said device comprising:

(a) electrode means,

(b) a photo-conductive layer member laminated to said electrode means, having maximum thickness and a surface defining the maximum thickness between the electrode means,

(c) a gap defined between the surface and a recording member disposed to face the surface of the photo-conductive layer member,

wherein said maximum thickness of the photo-conductive layer is smaller than a distance of said gap.

4,999,713

INTERLOCKED ZOOMING APPARATUS FOR USE IN STEREOSCOPIC CAMERAS

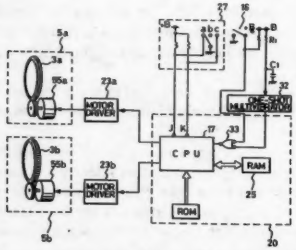
Atsushi Ueno, and Takao Suzuki, both of Tochigi, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 3, 1989, Ser. No. 318,634

Claims priority, application Japan, Mar. 7, 1988, 63-53024; Jun. 14, 1988, 63-146601

Int. Cl.[5] H04N *9/54*

U.S. Cl. 358—225 **14 Claims**



1. An interlocked zooming apparatus for operating a pair of video cameras, provided spaced apart from each other, in a synchronized manner for sensing an image of an object, a first video camera of the pair of video cameras comprising first zoom means and a second video camera of the pair of video cameras comprising second zoom means, each of the first and second zoom means moved between a first position corresponding to a first focal length and a second position corresponding to a second focal length, the interlocked zooming apparatus comprising:

first focal length changing means for changing the focal length of said first zoom means;

second focal length changing means for changing the focal length of the second zoom means;

zoom driving means for driving said first focal length changing means and said second focal length changing means in a synchronized manner by electric power; and

magnification adjusting means, for adjusting to a first size a size of the image in the first position of each of the first zoom means and the second zoom means and for adjusting to a second size a size of the image in the second position of each of the first zoom means and the second zoom means, consisting of

first position adjusting means for adjusting the first position of the first zoom means, and

second position adjusting means for adjusting the second position of the first zoom means.

4,999,714

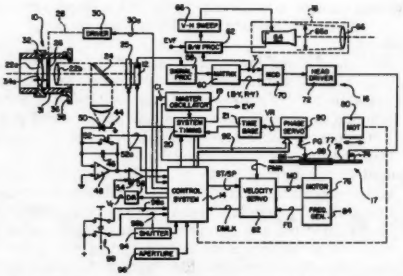
STILL VIDEO CAMERA HAVING VIDEO SYNCHRONIZED TO DRIVE MOTOR PHASE

Richard M. Vogel, Henrietta, and Mitchell J. Milton, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 9,324, Jan. 30, 1987, abandoned. This application Jul. 6, 1989, Ser. No. 376,184

Int. Cl.[5] H04N *5/95*

U.S. Cl. 358—337 **2 Claims**



1. A video time base synchronization circuit for use with a video camera for recording a video signal representative of a still picture on a recording disk, the still video signal including a vertical synchronizing signal that is recorded on the disk in predetermined relation to a sensible, radial reference position when the disk is rotated at a predetermined standard velocity, said camera further including a drive motor for rotating the disk and generating a feedback control signal, a master oscillator for providing a motor frequency reference signal, and a velocity servo responsive to said motor frequency reference signal and said feedback control signal for regulating the angular velocity of the drive motor and generating a lock-up signal when the velocity of the drive motor substantially corresponds to the standard velocity; the improvement wherein the video time base synchronization circuit comprises:

a time base generator for providing the vertical synchronizing signal, said generator responsive to a reset input for resetting the time base of said vertical synchronizing signal;

a window generator for generating a timing signal having a periodic window that recurs in relation to said rotating disk in a position including within its widthwise dimension the expected location of the reference position;

means for generating a phase signal composed of periodic pulses normally occurring within the timing of said periodic window and corresponding to the sensed, actual location of the reference position as the disk is rotated, the rotation of the disk being subject to occasional phase instability whereby one or more of said periodic pulses occur outside of said periodic window; and

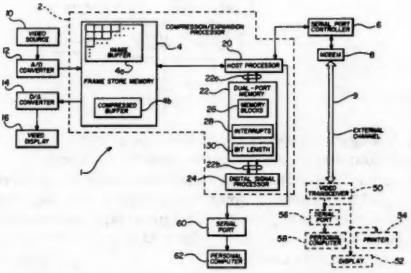
phase control means responsive to said lock-up signal, said timing signal, and to said occurrence of at least one of said periodic pulses outside of said periodic window, due to said occasional phase instability of the rotating disk, for activating the reset input of said time base generator so that the vertical synchronizing signal is recorded in correct relation to the reference position.

4,999,715

DUAL PROCESSOR IMAGE COMPRESSOR/EXPANDER

Rocco J. Porcellio, and David I. Zimmer, both of Fairport, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 1, 1989, Ser. No. 444,462
Int. Cl.[5] H04N *1/415*
U.S. Cl. 358—433 **6 Claims**



1. An image compression and expansion processor, comprising

an image buffer capable of storing image data arranged in predefined blocks;

a compressed data buffer capable of storing compressed data;

a dual port memory organized into a plurality of image data processing blocks for storing image data and a compressed data processing block for storing compressed data, said dual port memory having first and second memory ports for transferring data to and from the memory;

a host processor for controlling the movement of image data and compressed data between either said image buffer or said compressed data buffer through said first memory port to respective data processing blocks;

interrupt means for signalling the filling of a particular data processing block;

digital signal processor means responsive to said interrupt means for accessing the the filled data processing block through said second port and for initiating a compression or expansion operation upon the accessed data; and

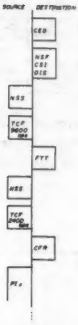
bit length defining means for defining the bit length of compressed data in the compressed data processing block corresponding to a predefined block of image data, whereby said host processor periodically moves defined lengths of compressed data between the dual port memory and the compressed data buffer while said digital signal processor is concurrently expanding to or compressing from said predefined blocks of image data.

4,999,716

FACSIMILE COMMUNICATION METHOD AND FACSIMILE MACHINE

Seiji Nakamura, Atsugi, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Aug. 3, 1989, Ser. No. 388,814
Claims priority, application Japan, Aug. 12, 1988, 63-201176; Aug. 17, 1988, 63-205060; Apr. 18, 1989, 64-99777
Int. Cl.[5] H04N *1/00*
U.S. Cl. 358—434 **20 Claims**



1. A facsimile communication method in which a receiving facsimile machine receives a training check field signal TCF from a transmitting facsimile machine and sends a confirmation to receive signal CFR or a failure to train signal FTT to the transmitting facsimile machine depending on a result of the reception of the training check field signal TCF so as to determine a modem transmission speed, said facsimile communication method comprising the steps of:

detecting a number of erroneous bits in the training check field signal TCF which is sent from the transmitting facsimile machine at an initial modem transmission speed and received by the receiving facsimile machine;

setting the modem transmission speed based on the detected number of erroneous bits;

adding a facsimile information bit which indicates the set modem transmission speed to the failure to train signal FTT which is sent from the receiving facsimile machine to the transmitting facsimile machine; and

sending the training check field signal TCF from the transmitting facsimile machine to the receiving facsimile machine at the modem transmission speed indicated by said failure to train signal FTT.

4,999,717

IMAGE READING APPARATUS

Nao Nagashima, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 21, 1988, Ser. No. 273,478
Claims priority, application Japan, Nov. 28, 1987, 62-301012
Int. Cl.[5] H04N *1/04*
U.S. Cl. 358—448 **8 Claims**

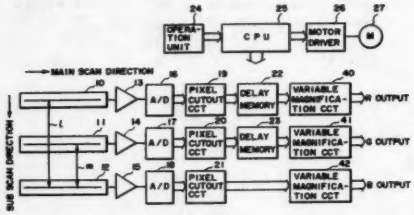
1. An image reading apparatus comprising:

plural line sensors each comprising a plurality of photosensitive elements, said line sensors being arranged such that lines read at a given instant by said plurality of line sensors mutually differ;

moving means for causing relative movement of said plurality of line sensors and an original image in a direction perpendicular to a scanning direction of said line sensors at a speed corresponding to a reading magnification or a reading density of the original image;

extracting means for cutting out image data from image data output from at least one of said line sensors;

delay means for delaying by a delay time the image data cut out by said extracting means, the delay time being varied in accordance with the reading magnification or the reading density of the original image; and



varying means for varying an amount of image data to be extracted by said extracting means in accordance with the reading magnification or the reading density of the original image.

4,999,718

IMAGE PROCESSING APPARATUS WITH INTERFERENCE SUPPRESSION

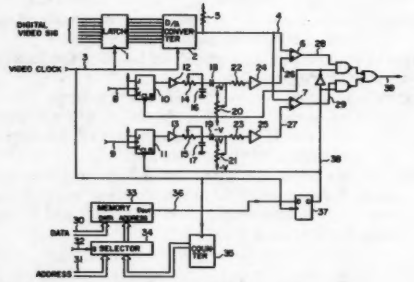
Hitoshi Arai, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 25, 1987, Ser. No. 90,238

Claims priority, application Japan, Aug. 29, 1986, 61-201606

Int. Cl.[5] H04N *1/40*

U.S. Cl. 358—455 **16 Claims**



2. An image processing apparatus comprising:

image signal generation means for generating an image signal; and

pulse-width-modulation signal generation means for processing the image signal generated by said image signal generation means by using a pattern signal to produce a pulse-width-modulation signal;

said pulse-width-modulation signal generation means including a first pattern signal generation means and a second pattern signal generation means for respectively generating first and second pattern signals of different periods, selection means for selecting one of said first and second pattern signals, and inhibit means for inhibiting the generation of the pattern signal not selected by said selection means;

wherein said pulse-width-modulation signal generation means includes compare means for comparing the pattern signal selected by said selection means with said image signal to produce the pulse-width modulation signal.

4,999,719

MAGNETIC RECORDER-REPRODUCER INCLUDING A ONE-FRAME-TAKING CONTROL SEQUENCE

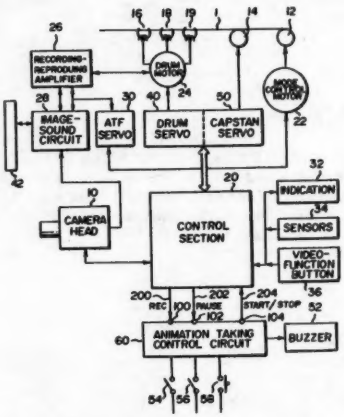
Katutoshi Tozaki, and Yoshiaki Nakayama, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Japan

Continuation of Ser. No. 909,324, Sep. 19, 1986, abandoned. This application May 26, 1989, Ser. No. 357,679

Claims priority, application Japan, Sep. 25, 1985, 60-211780; Sep. 25, 1985, 60-211781

Int. Cl.[5] H04N *5/782*

U.S. Cl. 360—35.1 **2 Claims**



1. A magnetic recorder-reproducer comprising:

photographing means for photographing an object;

recording and reproducing means responsive to an output signal from said photographing means for recording information of said object onto a magnetic tape in a recording mode and for reproducing information on the tape in a reproducing mode;

the recording and reproducing means including servo means for regulating operation of the recording and reproducing means in the recording and reproducing modes;

record signal generating means for generating a record signal during the actual recording operation by said recording means;

first control means, responsive to an input of a record start signal, for placing the recording and reproducing means in the reproducing mode to fix the speed and phase of the servo means during a reproducing mode and, substantially at the point of completion of a preceding recording, switching said recording and reproducing means from the reproducing mode over to the recording mode to allow said recording means to start its recording operation; the first control means being responsive to input of a stop signal, for stopping the recording operation by said recording means and for rewinding said magnetic tape by a given amount to prepare for the succeeding photographing;

operating means for indicating a one-frame-taking recording operation; and

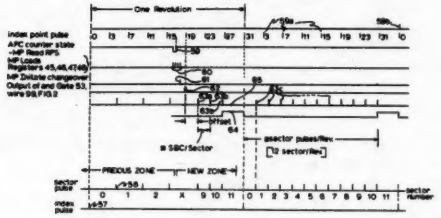
second control means, responsive to an output signal from said operating means, for outputting said record start signal to said first control means, for receiving said record signal generated by said record signal generating means as said record start signal is output, and, after a lapse of a predetermined time for the input of said record signal, for outputting said stop signal to said first control means, thereby executing a predetermined field number of one-frame-takings.

4,999,720

ZONE DENSITY SECTOR COUNTER

Rosser S. Wilson, Menlo Park, and Frank Seuberling, Fremont, both of Calif., assignors to Maxtor Corporation, San Jose, Calif.

Filed Jun. 5, 1989, Ser. No. 361,550
Int. Cl.[5] G11B 5/09
U.S. Cl. 360—48 14 Claims



Sequence of Sector Length change in The First Embodiment

1. A circuit for providing a valid sector count in a storage system having a plurality of recording zones comprising:

first counting means for providing a reference count signal;

first storage means for storing an offset value representing angular displacement between said reference count signal and a next consecutive sector of a target recording zone;

second counting means coupled to said first counting means and said first storage means for providing a sector count output signal after occurrence of said angular displacement.

4,999,721

RECORDING AND/OR REPRODUCING APPARATUS

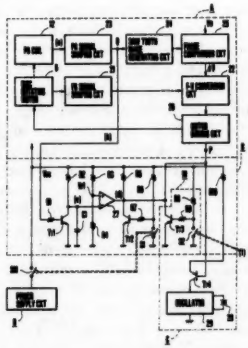
Masahiko Ogawa, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 401,559, Aug. 28, 1989, abandoned, which is a continuation of Ser. No. 281,869, Dec. 7, 1988, abandoned, which is a continuation of Ser. No. 39,803, Apr. 15, 1987, abandoned, which is a continuation of Ser. No. 562,704, Dec. 19, 1983, abandoned. This application Feb. 13, 1990, Ser. No. 479,346

Claims priority, application Japan, Dec. 23, 1982, 57-230461; Dec. 23, 1982, 57-230462

Int. Cl.[5] G11B 15/44

U.S. Cl. 360—74.1 49 Claims



1. A recording and/or reproducing apparatus using a recording medium having an engaging portion provided with a magnetized indicating member, comprising:

(a) driving means for driving the recording medium at a predetermined period according to an operation instructing signal, said driving means being arranged to drive said recording medium by engaging with the engaging portion of said recording medium and holding it;

(b) detection means for detecting the movement of said recording medium, said detecting means generating a periodical signal in response to the movement of said recording medium by detecting said indicating member magnetically;

(c) stop means for stopping the driving of the recording medium driven by said driving means in the case where said detection means does not output a predetermined amount of said periodical signal within a predetermined period of time after the driving means is caused to operate to drive the recording medium;

(d) loading detection means for detecting completion of loading of the recording medium into said apparatus; and

(e) delay means for driving said driving means after a predetermined lapse of time from the detection of loading of said recording medium by said loading detection means in the case where the operation instructing signal is delivered to the driving means prior to the loading of said recording medium.

4,999,722

MULTI-CHANNEL INFORMATION SIGNAL REPRODUCING APPARATUS FOR REPRODUCING INFORMATION SIGNALS FROM A TAPE-SHAPED RECORD BEARING MEDIUM HAVING A PLURALITY OF AREAS WHICH RESPECTIVELY EXTEND LONGITUDINALLY AND PARALLEL WITH EACH OTHER

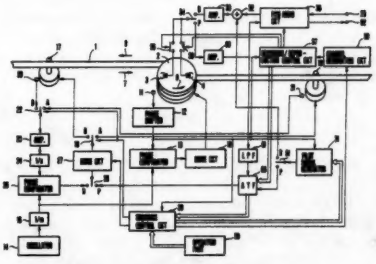
Susumu Kozuki, Tokyo; Tatsuzo Ushiro, Saitama; Toshiyuki Masui, Kanagawa; Masahiro Takei, Kanagawa, and Kenichi Nagasawa, Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 785,456, Oct. 8, 1985, abandoned. This application Aug. 22, 1988, Ser. No. 235,793

Claims priority, application Japan, Dec. 17, 1984, 59-265661; Dec. 17, 1984, 59-265662; Dec. 17, 1984, 59-265663

Int. Cl.[5] G11B 5/584, 15/467

U.S. Cl. 360—77.150 26 Claims



4. A multi-channel information signal reproducing apparatus for reproducing information signals from a tape-shaped record bearing medium having a plurality of areas which respectively extend longitudinally in parallel with each other, comprising:

(a) a rotary head for obliquely tracing said tape-shaped record bearing medium;

(b) designating means for designating one of said plurality of areas;

(c) gate means which has signals reproduced by said rotary head applied thereto and has its gate timing determined according to the area designated by said designating means;

(d) reproduced signal processing means for processing said information signals included in signals gated by said gate means; and

(e) control means for controlling said designating means by using signals gated by said gate means.

4,999,723

MAGNETIC RECORDING AND REPRODUCING DEVICE HAVING A CASSETTE LOADING MECHANISM DRIVEN BY A PINCH ROLLER

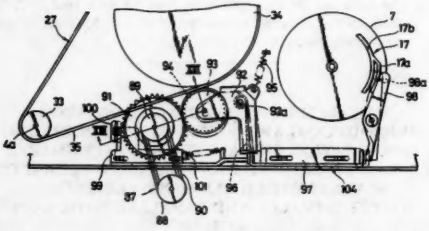
Takashi Yamanaka, Tokyo, Japan, assignor to Tanashin Denki Co., Ltd., Tokyo, Japan

Division of Ser. No. 127,756, Dec. 2, 1987, Pat. No. 4,914,536. This application Nov. 3, 1989, Ser. No. 431,194

Claims priority, application Japan, May 30, 1987, 62-137538

Int. Cl.[5] G11B *15/675*

U.S. Cl. 360—96.5 5 Claims



1. In a magnetic recording and reproducing device which includes a cassette loading mechanism which, when a cassette is inserted to a predetermined condition into a cassette housing, moves the cassette to a loaded position in which the cassette is fitted on reel shafts and which discharges, in response to a cassette unloading instruction signal, the cassette from the loaded position outwardly of said cassette housing and wherein rotation of a capstan motor is transmitted to a tape driving mechanism by way of a pair of pulleys and an endless belt, the improvement comprising:

a movable member;

a rotatable pinch roller mounted on said movable member and connected to said cassette loading mechanism; and

means for pressing said pinch roller against said endless belt so that said pinch roller is rotated by said endless belt in order to drive said cassette loading mechanism by a turning force of said pinch roller.

4,999,724

DISK DRIVE HAVING AN ELECTRICALLY ISOLATED DISK STACK

Jeffrey S. McAllister, Boise, and Steven M. Johnson, Eagle, bothof, Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 13, 1989, Ser. No. 434,656

Int. Cl.[5] G11B *17/02, 33/14, 17/08*

U.S. Cl. 360—98.08 16 Claims

1. A disk drive, comprising:

a metal frame having a first electrical potential;

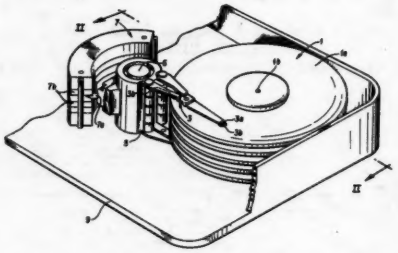
magnetic memory disk means having a magnetic memory disk rotatably mounted on said metal frame and electrically insulated therefrom;

metal actuator means movably mounted on said metal frame and electrically insulated therefrom;

a magnetic head mounted on said metal actuator means in a position over said magnetic memory disk;

said magnetic head having a coil; and

circuit means for supplying, a second electrical potential to said coil, to said magnetic head, and to said magnetic



memory disk, which potential is different from the potential of said metal frame.

4,999,725

READ/WRITE HEAD CARRYING MECHANISM FOR FLOPPY DISK DRIVE

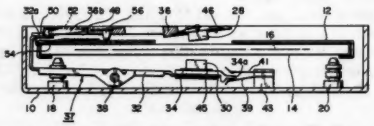
Shoji Takahashi, Hannou, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Jul. 20, 1989, Ser. No. 383,411

Claims priority, application Japan, Jul. 29, 1988, 63-190860; Jul. 29, 1988, 63-190859

Int. Cl.[5] G11B *5/54, 5/55*

U.S. Cl. 360—105 12 Claims



1. A read/write head carrying mechanism, including a carrier in which a disk cartridge accommodating a floppy disk is detachably loaded, said carrier being capable of assuming a loading position and an unloading position in accordance with the vertical movement thereof, and in said loading position upper and a lower heads are in close contact with both surfaces of the floppy disk and integrally slide along a head moving path established in the radial direction of the floppy disk, said read/write head carrying mechanism comprising:

a guide rail secured to a frame in parallel to the head moving path with a predetermined distance there between;

a carriage, disposed below said carrier and supported slidably and swingably by said guide rail, on which said lower head is mounted, said carriage having one end extending along one side and an upper side of said carrier;

an upper arm, swingably supported by said one end of said carriage and extending over the upper surface of said carrier, and to which said upper head is secured;

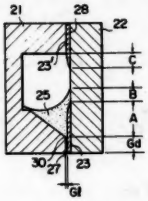
a pushup means mounted on the upper surface of said carrier, said pushup means coming to contact with a portion of the carriage connected to the upper arm and causes said carriage to swing open downwardly at a position opposite to both heads with said guide rail as a fulcrum therebetween.

4,999,726

MAGNETIC CORE FOR FLYING-TYPE COMPOSITE MAGNETIC HEAD

Ryo Goto; Tadafumi Tomitani, both of Mouka; Fumio Nitanda, Fukaya; Manabu Toyoda, Mouka, and Makoto Ushijima, Tokyo, all of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Mar. 27, 1989, Ser. No. 329,324
Claims priority, application Japan, Mar. 29, 1988, 63-75258
Int. Cl.[5] G11B 5/235
U.S. Cl. 360—120 4 Claims



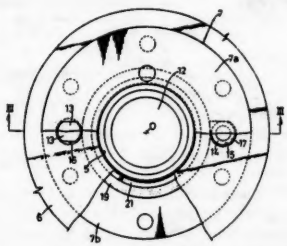
1. A magnetic core for a flying-type composite magnetic head comprising:
(a) a pair of core pieces;
(b) a glass portion for bonding said pair of core pieces;
(c) a window defined by said pair of core pieces;
(d) a magnetic gap defined by said pair of core pieces on one side of said window; and
(e) a thin magnetic metal layer formed on at least one of opposing surfaces of said core pieces from an outer end of said magnetic gap to said window, said thin magnetic metal layer extending by 10 μm or more beyond an inner end of said magnetic gap and terminating by 15 μm or more inside an inner end of said bonding glass portion.

4,999,727

DISC CARTRIDGE WITH ALIGNMENT ELEMENTS ON TWO HUB HALVES

Yoshitake Kato, Yuki, Japan, assignor to Hitachi Maxell Ltd., Osaka, Japan

Continuation of Ser. No. 643,320, Aug. 22, 1984, abandoned.
This application Sep. 30, 1988, Ser. No. 251,530
Claims priority, application Japan, Aug. 24, 1983, 58-155232
Int. Cl.[5] G11B 23/03
U.S. Cl. 360—133 8 Claims



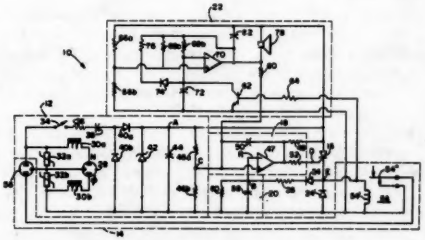
1. A disc cartridge comprising a hub assembly formed by a pair of hub halves assembled together holding a disc sheet therebetween in such a manner that a peripheral portion of a central hole defined in a center portion of said disc sheet is clamped by butting faces of said hub halves, each of said hub halves being provided with a central hole corresponding to said central hole of said disc sheet, and corresponding drive pin receiving holes of oblong shape defined at a position eccentric to said central hole and one of said hub halves is provided further with a positioning projection on a butting face thereof, while the other of said hub halves is provided with a positioning recess complementary to said positioning projection, said drive pin receiving holes and said positioning projection and recess being located symmetrical with respect to the central of said central hole of said disc sheet, said disc sheet having recording areas on both surfaces thereof being provided with circular through holes corresponding respectively to said positioning projection and said drive pin receiving holes also located symmetrical with respect to the center of said central hole of said disc sheet, said through holes having diameters generally equal to diameters of said drive pin receiving holes and said positioning projection such that upon assembly said drive pin receiving holes and said positioning projection align with and penetrate into said circular through holes of said disc sheet, respectively.

4,999,728

POWER SURGE PROTECTION CIRCUIT

Ricky L. Curl, Pinson, Ala., assignor to Atlas Technology, Inc., Birmingham, Ala.

Filed Feb. 27, 1989, Ser. No. 315,596
Int. Cl.[5] H02H 3/26
U.S. Cl. 361—33 11 Claims



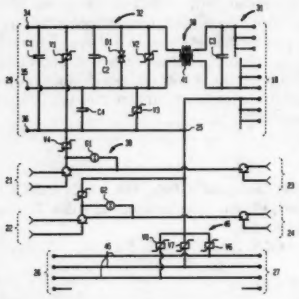
1. Apparatus for protecting electronic equipment from a line voltage transient resulting from a temporary power line interruption comprising:
power input means for receiving alternating current line voltage and providing first and second signals derived from the line voltage;
power output means operatively connected to said power input means for connecting the line voltage to the protected electronic equipment, said power output means including a normally open switch responsive to said first signal for connecting the electronic equipment to the power line and responsive to the interruption of said first signal for disconnecting the protected electronic equipment from the power line;
signal comparing means responsive to said second signal and a reference signal for providing a gate signal when said second signal has a predetermined relationship to said reference signal;
gated switch means responsive to said first signal and said gate signal for transmitting said first signal to said power output means and to said signal comparing means such that said first signal, when so transmitted, constitutes the reference signal; and
energy storage means coupled to said signal comparing means and responsive to said first signal such that (a) said energy storage means is charged up to the level of said first signal when said first signal is transmitted to said signal comparing means, and (b) said energy storage means is discharged at a preselected rate so as to provide the reference signal after a power line interruption when said second signal is interrupted from said signal comparing means;
said discharge rate being selected to provide a time delay after the power line interruption during which the electronic equipment is maintained disconnected from the power line.

4,999,729

SATELLITE RECEIVER PROTECTION APPARATUS

Francis J. Stifter, 171 S. Main St., Natick, Mass. 01760

Filed Aug. 9, 1989, Ser. No. 391,336
Int. Cl.[5] H02H *9/06*
U.S. Cl. 361—56 20 Claims



1. A satellite receiver protection apparatus comprising:

a housing;

electrical power supply connection means retained by said housing and adapted for connection to an AC outlet;

a plurality of AC outlet sockets retained by said housing;

electrical power surge suppressor means retained within said housing and connected between said supply means and said outlet sockets;

electrical input terminal means retained by said housing and adapted for connection to a satellite dish antenna;

electrical output terminal means retained by said housing and adapted for connection to a television receiver;

electrical signal surge suppressor means retained within said housing and connected between said input terminal means and said output terminal means;

ground circuit means retained by said housing and connected to said power and signal surge suppressor means;

a plurality of first control terminals retained by said housing and adapted for connection to orientation motor and sensor lines of the satellite dish antenna;

a plurality of second control terminals retained by said housing and adapted for connection to the satellite dish antenna orientation control unit;

control line means retained by said housing and connecting said first and second control terminals; and

control line surge suppressor means retained within said housing and connected between said control line means and said ground circuit means.

4,999,730

LINE VOLTAGE MONITOR AND CONTROLLER

Harold W. Pickard, 10 Collins Rd., Ulm, Mont. 59485

Filed May 10, 1989, Ser. No. 350,614
Int. Cl.[5] H02H *3/24*
U.S. Cl. 361—59 14 Claims

1. An automatic control circuit for controlling a power signal connection between an AC power line and AC-powered user equipment, the circuit comprising:

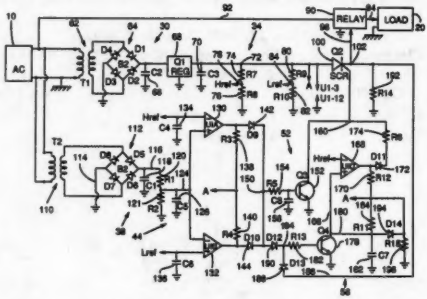
a first switch means for switching the power signal connection between the power line and the user equipment;

AC input means connectable to the power line for coupling the AC power line to the circuit;

AC voltage monitoring means connected to the AC input means for detecting and indicating a fault condition whenever the power line voltage is outside a predetermined AC operating voltage window;

turn-off means coupled to the monitoring means for actuating the first switch means to disconnect the user equipment from the power line responsive to the indication of a fault condition; and

restore means for actuating the first switch means to connect the user equipment to the power line upon completion of



a predetermined delay period commencing when a fault condition is no longer indicated;

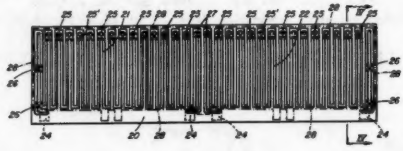
the restore means being coupled to the monitoring means so that an indication of a second fault condition during the delay period restarts the delay period.

4,999,731

SURGE PROTECTOR FOR TELECOMMUNICATIONS SYSTEMS

David K. Bender, Tequesta, and Richard R. Lathrop, Jr., Royal Palm Beach, both of Fla., assignors to Northern Telecom Limited, Montreal, Canada

Continuation of Ser. No. 899,403, Aug. 22, 1986, abandoned.
This application Apr. 13, 1990, Ser. No. 511,437
Int. Cl.[5] H02H *9/00;* H01C *10/00*
U.S. Cl. 361—119 34 Claims



1. A surge protector having enhanced capacity to withstand surge conditions, comprising:

a ceramic substrate;

a resistive serpentine path comprising adjacent electrically resistive path lengths formed on one surface of the ceramic substrate;

the width of a path length and the distance between adjacent path lengths being relatively narrow, said path lengths being arranged to substantially evenly distribute surge induced heat on said substrate during surge conditions; and

a plurality of first trimming means for adjusting total length of said resistive serpentine path, said first trimming means being substantially evenly distributed along a first edge portion of said substrate between adjacent path lengths of said serpentine path, each of said first trimming means providing a substantially equal adjustment to a total resistive value of said serpentine path, so that even after trimming, said path lengths substantially evenly heat said substrate during surge conditions.

4,999,732

DEGAUSSING CIRCUIT FOR CRT

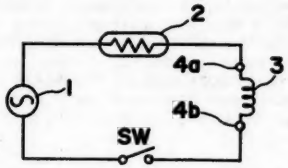
Masahito Mihara, Yokaichi, Japan, assignor to Murata Manufacturing Co., Ltd., Japan

Filed Nov. 10, 1988, Ser. No. 269,917

Claims priority, application Japan, Nov. 13, 1987, 62-174157[U]

Int. Cl.[5] H01J *29/00*

U.S. Cl. 361—150 11 Claims



1. A degaussing circuit for degaussing a cathode ray tube having a degaussing coil mounted on a back of said cathode ray tube and a positive temperature coefficient thermistor connected in series with said degaussing coil;

said series connection of said degaussing coil and PTC thermistor being connected across a low-frequency AC line supply so that a degaussing current having said low frequency of said AC line supply passes through said degaussing coil;

wherein the degaussing coil has an inductance and the thermistor has a capacitance; and

wherein a resonance frequency determined by the inductance of said degaussing coil and the capacitance of said positive temperature coefficient thermistor is below substantially 14 kHz.

4,999,733

WEB ELECTRICITY REMOVING ROLLER

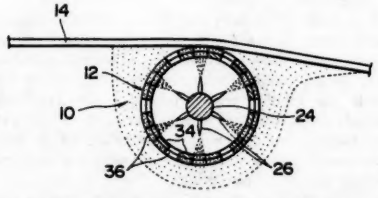
Tunenari Kakuda, Fujinomiya, Japan, assignor to Fuji Photo Film Co., Ltd., Tokyo, Japan

Filed Apr. 27, 1989, Ser. No. 343,562

Claims priority, application Japan, Apr. 28, 1988, 63-107207

Int. Cl.[5] H05F *3/06;* H01T *23/00*

U.S. Cl. 361—213 8 Claims



1. A web electricity removing roller comprising:

a rotary cylindrical body having an outer peripheral surface for guiding contact with a web and being electrically connectable with a ground;

a discharge electrode inserted into said cylindrical body for radiating charged particles by corona discharge toward said cylindrical body;

said cylindrical body having an inner peripheral surface formed of an insulating material; and

a plurality of through bores, in said cylindrical body, for discharging said charged particles to said outer peripheral surface of said cylindrical body.

4,999,734

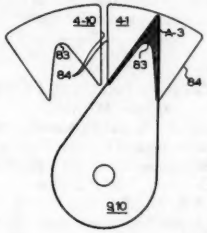
ELECTRODE ARRAY MADE FROM CONCAVE ELECTRODES FOR METER READING DEVICE

Edward P. Smith, North Richland Hills, Tex., assignor to Siecor Corporation, Hickory, N.C.

Filed Jan. 2, 1990, Ser. No. 460,019

Int. Cl.[5] H01G *5/01;* G08C *19/10*

U.S. Cl. 361—278 8 Claims



1. An electrode array comprising a substrate having first and second surfaces on which there is disposed on said first surface:

(a) adjacent electrodes spaced apart from one another delimiting a center portion and an aperture in said substrate located in said center portion;

(b) a center electrode, having an aperture therein, in said center portion; and

(c) an axle, disposed in the apertures of the center electrode and substrate, and a meter hand affixed to the axle, each adjacent electrode and said meter hand having predetermined shape and respective areas so that the area of any given member of said adjacent electrodes subtended by said meter hand is substantially constant as the axle is rotated and the meter hand is traversed across said adjacent electrodes.

4,999,735

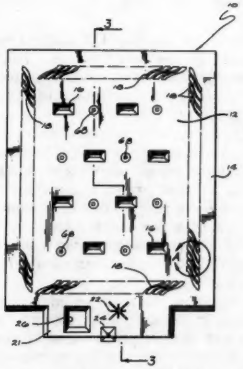
DIFFERENTIAL CAPACITIVE TRANSDUCER AND METHOD OF MAKING

L. Bruce Wilner, Palo Alto, Calif., assignor to Allied-Signal Inc., Phoenix, Ariz.

Filed Mar. 8, 1990, Ser. No. 491,132

Int. Cl.[5] H01G *7/00;* G01L *1/22*

U.S. Cl. 361—283 20 Claims



1. In a differential variable capacitance transducer including a first layer of semiconductor material having a rim of insulating material and a surface thereof acting as one plate of a capacitor, a second layer of semiconductor material having a rim of insulating material and a surface thereof acting as a plate

of a capacitor, an intermediate layer of semiconductor material positioned between said first and second plates including a rim adjacent said rims of said first and second layers, a seismic mass and means suspending said mass from said rim such that said mass moves toward and away from said capacitor plates when said accelerometer is exposed to acceleration forces,

characterized in that said suspending means includes a plurality of suspension members extending from said intermediate layer rim to said seismic mass, said members being formed and shaped such that they deviate from straightness and are subjected to tension along their length.

4,999,736

SOLID DIELECTRIC CAPACITOR AND METHOD OF MANUFACTURE

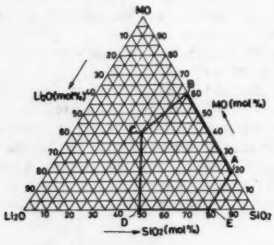
Hiroshi Kishi, Fujioka; Hirokazu Chazono, Takasaki; Minoru Oshio; Hiroshi Saito, both of Gunma; Toshiya Nakamura, and Hisamitsu Shizuno, both of Takasaki, all of Japan, assignors to Taiyo Yden Co., Ltd., Tokyo, Japan

Filed Feb. 21, 1990, Ser. No. 482,654

Claims priority, application Japan, Feb. 28, 1989, 1-48873

Int. Cl.[5] C04B *35/46*; H01G *4/12, 4/10*

U.S. Cl. 361—321 **9 Claims**



1. A solid dielectric capacitor comprising a dielectric ceramic body and at least two electrodes in contact therewith, the dielectric ceramic body consisting essentially of:

(a) 100 parts by weight of a major ingredient expressed by the formula,

$$(1-\alpha)\{(Ba_{k-x-y}L_xM_y)O_kTiO_2\}+\alpha CaZrO_3,$$

where

L is at least either of magnesium and zinc;

M is at least either of calcium and strontium;

α is a numeral not less than 0.005 and not greater than 0.040;

k is a numeral not less than 1.00 and not more than 1.05;

x is a numeral greater than 0 and less than 0.10;

y is a numeral greater than 0 and not greater than 0.05; and

the sum of x and y is a numeral not less than 0.01 and not greater than 0.10; and

(b) from 0.2 to 5.0 parts by weight of an additive mixture of lithium oxide silicon dioxide and at least one metal oxide selected from the group consisting of barium oxide, strontium oxide, calcium oxide, magnesium oxide and zinc oxide, the relative proportions of lithium oxide, silicon dioxide and at least one selected metal oxide constituting the additive mixture being in that region of the ternary diagram of FIG. 2 attached hereto which is bounded by lines sequentially connecting:

the point A where the additive mixture consists of one mole percent lithium oxide, 80 mole percent silicon dioxide, and 19 mole percent metal oxide;

the point B where the additive mixture consists of one mole percent lithium oxide, 39 mole percent silicon dioxide, and 60 mole percent metal oxide;

the point C where the additive mixture consists of 30 mole percent lithium oxide, 30 mole percent silicon dioxide, and 40 mole percent metal oxide;

the point D where the additive mixture consists of 50 mole percent lithium oxide, 50 mole percent silicon dioxide, and 0 mole percent metal oxide; and

the point E where the additive mixture consists of 20 mole percent lithium oxide, 80 mole percent silicon dioxide, and 0 mole percent metal oxide;

4,999,737

SOLID DIELECTRIC CAPACITOR AND METHOD OF MANUFACTURE

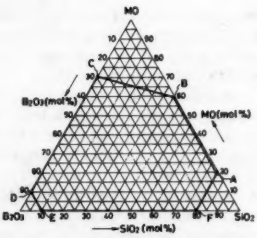
Hiroshi Kishi, Fujioka; Hirokazu Chazono, Takasaki; Minoru Oshio; Hiroshi Saito, both of Haruna; Toshiya Nakamura, and Hisamitsu Shizuno, both of Takasaki, all of Japan, assignors to Taiyo Yuden Co., Ltd., Tokyo, Japan

Filed Feb. 21, 1990, Ser. No. 482,659

Claims priority, application Japan, Feb. 28, 1989, 1-48872

Int. Cl.[5] C04B *35/46*; H01G *4/10, 4/12*

U.S. Cl. 361—321 **9 Claims**



1. A solid dielectric capacitor comprising a dielectric ceramic body and at least two electrodes in contact therewith, the dielectric ceramic body consisting essentially of:

(a) 100 parts by weight of a major ingredient expressed by the formula,

$$(1-\alpha)\{(Ba_{k-x-y}L_xM_y)O_kTiO_2\}+\alpha CaZrO_3,$$

where

L is at least either of magnesium and zinc;

M is at least either of calcium and strontium;

α is a numeral not less than 0.005 and not greater than 0.040;

k is a numeral not less than 1.00 and not more than 1.05;

x is a numeral greater than 0 and less than 0.10;

y is a numeral greater than 0 and not greater than 0.05; and

the sum of x and y is a numeral not less than 0.01 and not greater than 0.10; and

(b) from 0.2 to 5.0 parts by weight of an additive mixture of boric oxide, silicon dioxide and at least one metal oxide selected from the group consisting of barium oxide, strontium oxide, calcium oxide, magnesium oxide and zinc oxide, the relative proportions of boric oxide, silicon dioxide and at least one selected metal oxide constituting the additive mixture being in that region of the ternary diagram of FIG. 2 attached hereto which is bounded by lines sequentially connecting:

the point A where the additive mixture consists of one mole percent boric oxide, 80 mole percent silicon dioxide, and 19 mole percent metal oxide;

the point B where the additive mixture consists of one mole percent boric oxide, 39 mole percent silicon dioxide, and 60 mole percent metal oxide;

the point C where the additive mixture consists of 30 mole percent boric oxide, 0 mole percent silicon dioxide, and 70 mole percent metal oxide;

the point D where the additive mixture consists of 90 mole percent boric oxide, 0 mole percent silicon dioxide, and 10 mole percent metal oxide;

the point E where the additive mixture consists of 90 mole

percent boric oxide, 10 mole percent silicon dioxide, and 0 mole percent metal oxide; and

the point F where the additive mixture consists of 20 mole percent boric oxide, 80 mole percent silicon dioxide, and 0 mole percent metal oxide.

4,999,738

SOLID DIELECTRIC CAPACITOR AND METHOD OF MANUFACTURE

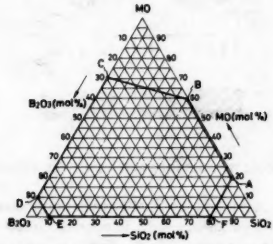
Hiroshi Kishi, Fujioka; Hirokazu Chazono, Takasaki; Minoru Oshio; Hiroshi Saito, both of Haruna; Toshiya Nakamura, and Hisamitsu Shizuno, both of Takasaki, all of Japan, assignors to Taiyo Yuden Co., Ltd., Tokyo, Japan

Filed Feb. 21, 1990, Ser. No. 483,079

Claims priority, application Japan, Feb. 28, 1989, 1-48870

Int. Cl.[5] C04B 35/46; H01G 4/10, 4/12

U.S. Cl. 361—321 9 Claims



1. A solid dielectric capacitor comprising a dielectric ceramic body and at least two electrodes in contact therewith, the dielectric ceramic body consisting essentially of:

(a) 100 parts by weight of a major ingredient expressed by the formula,

$$(1-\alpha)\{(Ba_{k-x}M_x)O_kTiO_2\}+\alpha CaZrO_3,$$

where

M is at least either of calcium and strontium;

α is a numeral in the range of 0.005 to 0.040;

k is a numeral in the range of 1.00 to 1.05; and

x is a numeral in the range of 0.01 to 0.05; and

(b) from 0.2 to 5.0 parts by weight of an additive mixture of boric oxide, silicon dioxide and at least one metal oxide selected from the group consisting of barium oxide, strontium oxide, calcium oxide, magnesium oxide and zinc oxide, the relative proportions of boric oxide, silicon dioxide and at least one selected metal oxide constituting the additive mixture being in that region of the ternary diagram of FIG. 2 attached hereto which is bounded by lines sequentially connecting:

the point A where the additive mixture consists of one mole percent boric oxide, 80 mole percent silicon dioxide, and 19 mole percent metal oxide;

the point B where the additive mixture consists of one mole percent boric oxide, 39 mole percent silicon dioxide, and 60 mole percent metal oxide;

the point C where the additive mixture consists of 30 mole percent boric oxide, 0 mole percent silicon dioxide, and 70 mole percent metal oxide;

the point D where the additive mixture consists of 90 mole percent boric oxide, 0 mole percent silicon dioxide, and 10 mole percent metal oxide;

the point E where the additive mixture consists of 90 mole percent boric oxide, 10 mole percent silicon dioxide, and 0 mole percent metal oxide; and

the point F where the additive mixture consists of 20 mole percent boric oxide, 80 mole percent silicon dioxide, and 0 mole percent metal oxide.

4,999,739

SOLID DIELECTRIC CAPACITOR AND METHOD OF MANUFACTURE

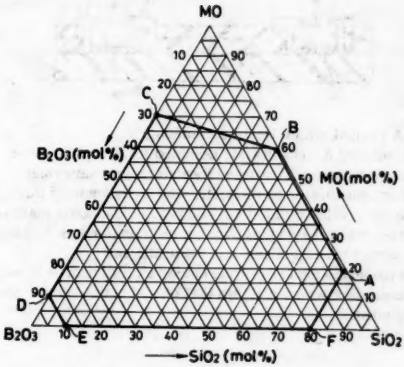
Hiroshi Kishi, Fujioka; Hirokazu Chazono, Takasaki; Minoru Oshio; Hiroshi Saito, both of Haruna; Toshiya Nakamura, and Hisamitsu Shizuno, both of Takasaki, all of Japan, assignors to Taiyo Yuden Co., Ltd., Tokyo, Japan

Filed Feb. 21, 1990, Ser. No. 483,140

Claims priority, application Japan, Feb. 28, 1989, 1-48868

Int. Cl.[5] C04B 35/46; H01G 4/10, 4/12

U.S. Cl. 361—321 9 Claims



1. A solid dielectric capacitor comprising a dielectric ceramic body and at least two electrodes in contact therewith, the dielectric ceramic body consisting essentially of:

(a) 100 parts by weight of a major ingredient expressed by the formula,

$$(1-\alpha)\{(Ba_{k-x}M_x)O_kTiO_2\}+\alpha CaZrO_3,$$

where

M is at least either of magnesium and zinc;

α is a numeral in the range of 0.005 to 0.040;

k is a numeral in the range of 1.00 to 1.05; and

x is a numeral in the range of 0.01 to 0.10; and

(b) from 0.2 to 5.0 parts by weight of an additive mixture of boric oxide, silicon dioxide and at least one metal oxide selected from the group consisting of barium oxide, strontium oxide, calcium oxide, magnesium oxide and zinc oxide, the relative proportions of boric oxide, silicon dioxide and at least one selected metal oxide constituting the additive mixture being in that region of the ternary diagram of FIG. 2 attached hereto which is bounded by lines sequentially connecting:

the point A where the additive mixture consists of one mole percent boric oxide, 80 mole percent silicon dioxide, and 19 mole percent metal oxide;

the point B where the additive mixture consists of one mole percent boric oxide, 39 mole percent silicon dioxide, and 60 mole percent metal oxide;

the point C where the additive mixture consists of 30 mole percent boric oxide, 0 mole percent silicon dioxide, and 70 mole percent metal oxide;

the point D where the additive mixture consists of 90 mole percent boric oxide, 0 mole percent silicon dioxide, and 10 mole percent metal oxide;

the point E where the additive mixture consists of 90 mole percent boric acid, 10 mole percent silicon dioxide, and 0 mole percent metal oxide; and

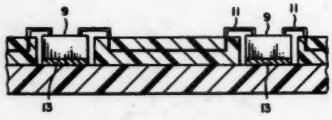
the point F where the additive mixture consists of 20 mole percent boric oxide, 80 mole percent silicon dioxide, and 0 mole percent metal oxide.

4,999,740

ELECTRONIC DEVICE FOR MANAGING AND DISSIPATING HEAT AND FOR IMPROVING INSPECTION AND REPAIR, AND METHOD OF MANUFACTURE THEREOF

Joseph M. Ilardi, Sparta, N.J., and Bernard P. Gollomp, West Lawrence, N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Mar. 6, 1989, Ser. No. 319,439
Int. Cl.[5] H05K 7/20, 1/18
U.S. Cl. 361—386 8 Claims



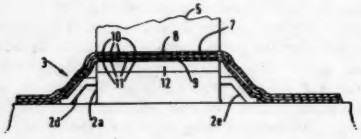
1. A printed circuit board comprising:
a laminated metal substrate designed for dissipating heat;
a curable dielectric material located on said substrate;
wells contacting said substrate, said wells made of through holes created by masking said curable dielectric material, said wells having active circuit components mounted therein which contact said substrate; and
the laminated metal substrate having a coefficient of thermal expansion which matches that of said active circuit components.

4,999,741

PACKAGE IN THE HEAT DISSIPATION OF ELECTRONIC DEVICES

Stephen G. Tyler, Witham, United Kingdom, assignor to The General Electric Company, p.l.c., London, England

Filed Jan. 24, 1989, Ser. No. 300,882
Claims priority, application United Kingdom, Jan. 26, 1988, 8801632
Int. Cl.[5] H05K 7/20
U.S. Cl. 361—387 12 Claims



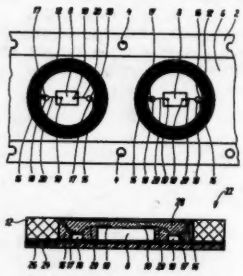
1. A package including at least one electronic device disposed on a substrate, comprising:
a base having a perimeter upon which the substrate is disposed;
a composite, thermally conductive flexible membrane attached to the perimeter of the base, the composite flexible membrane being in thermal contact with the at least one electronic device, said composite flexible membrane comprising a foil disposed between first and second flexible members each having apertures therein, said flexible member having apertures only in the region of the at least one electronic device and each of said first and second members having thermally conductive material disposed in the respective apertures thereof, the first flexible member being in thermal contact with the at least one electronic device; and
a heat sink disposed adjacent to the at least one electronic device, the heat sink being in thermal contact with the apertures of the second flexible member.

4,999,742

ELECTRONIC MODULE FOR A SMALL PORTABLE OBJECT SUCH AS A CARD OR A KEY INCORPORATING AN INTEGRATED CIRCUIT

Jean-Marcel Stampfli, Le Landeron, Switzerland, assignor to ETA SA Fabriques d'Ebauches, Granges, Switzerland

Filed Dec. 22, 1989, Ser. No. 455,011
Claims priority, application France, Dec. 27, 1988, 88 17210
Int. Cl.[5] H05H 7/02
U.S. Cl. 361—400 9 Claims



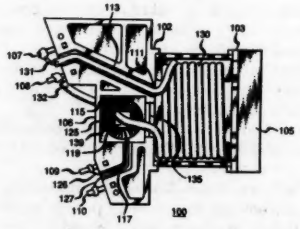
1. An electronic module for a small portable object, comprising:
a substrate (24;54) of electrically insulating material:
a substantially parallelepipedic integrated circuit chip (8;36) having a front surface provided with at least two connector lugs (10;38) and a back surface which is at least indirectly fixed to said substrate:
a coil (12;40) having two terminals (17;43) and also fixed to said substrate for enabling inductive coupling of the module (22;60) and an apparatus with which the object can cooperate, and respective electrical connections (18;20;46) between said at least two connector lugs and said terminals; and wherein said coil is an annular coil which surrounds a space in which the chip and said electrical connections are fully housed; wherein said coil has a substantially greater height than said chip and said space is filled with a hardened, electrically insulating adhesive material (28;58) so as to protect said chip.

4,999,743

TRANSFORMER WITH INCLUDED CURRENT SENSING ELEMENT

Edward C. Fontana, Dallas, Tex., and John S. Rucki, Hillside, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 27, 1989, Ser. No. 413,570
Int. Cl.[5] H05K 7/02; H01F 27/30
U.S. Cl. 361—400 10 Claims



1. A circuit assembly comprising:
a circuit board for accepting mounting of circuit components;

a magnetic component mounted on said circuit board, including;

a bobbin structure for supporting a winding and having apparatus for facilitating mounting of the bobbin structure on the cirucit board;

a component winding wound on said bobbin structure;

a sensing device comprising a magnetic core magnetically coupled to a lead of said component winding by having the lead pass through an aperture in the magnetic core and operative for sensing a current flow in said component winding;

the bobbin structure further having a cavity, positioned apart from the winding, for accepting the sensing device as an integral part of the magnetic component, and further having electrical terminal means on an external periphery of the bobbin structure for accessing signals generated by the sensing

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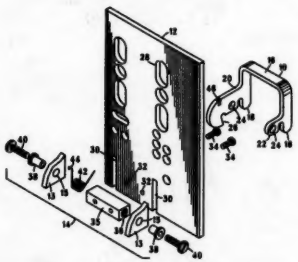
4,999,744

EJECTOR MECHANISM

Lowel E. Blankenship, Athens, Ala., assignor to Universal Data Systems, Inc., Huntsville, Ala.

Filed Dec. 28, 1989, Ser. No. 458,266
Int. Cl.[5] H05K *7/14*
U.S. Cl. 361—415 **5 Claims**



1. A printed circuit board (PCB) assembly configured to slide into an enclosure comprising:

two spaced apart PCB's;

means mounted at the rear of each PCB for electrically connecting each PCB with a connector;

means for mounting one of said PCB's to the other PCB so that said PCB's are parallel to each other;

ejector means pivotally mounted to said mounting means for applying a distributed force against an object not part of said assembly when said assembly is seated in the enclosure to cause substantially translational motion of said assembly away from the enclosure, said ejector means comprising a manually operable U-shaped lever with a central handle and two legs each with a distal end, said legs being pivotally mounted to said mounting means adjacent said one and other PCB, respectively, so that force is applied adjacent each PCB against the object upon pivotal rotation of said lever, said handle and legs integrally made as a single rigid element.

4,999,745

ELECTRICAL EQUIPMENT CHASSIS UNIT

Shigeru Shimatani, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

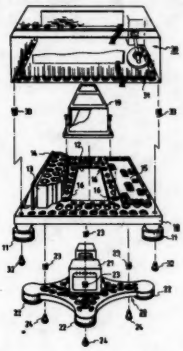
Filed Oct. 26, 1989, Ser. No. 426,653
Claims priority, application Japan, Dec. 21, 1988, 63-166097[U]
Int. Cl.[5] H02B *1/01*
U.S. Cl. 361—429 **6 Claims**

1. A chassis unit for electrical equipment comprising:

a main chassis on which is mounted electronic circuit elements that produce no vibration;

a sub-chassis on which is mounted an electronic circuit element that produces vibration; and

vibration absorbing means for absorbing vibration so as not to transmit the vibration from said sub-chassis to said main



chassis and for combining said main chassis with said sub-chassis;

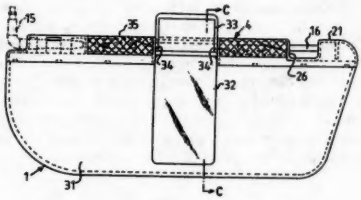
said main chassis being independent from said sub-chassis with respect to the propagation of the vibration.

4,999,746

SUNVISOR FOR MOTOR VEHICLES

E. Gunnar Svensson, Malung, Sweden, assignor to Autopart Sweden AB, Malung, Sweden

Filed Apr. 24, 1989, Ser. No. 341,964
Claims priority, application Sweden, Apr. 29, 1988, 8801632
Int. Cl.[5] B60Q *3/00*
U.S. Cl. 362—74 **6 Claims**



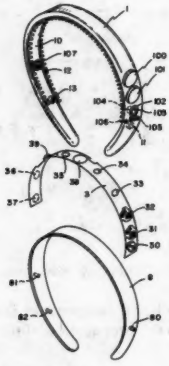
1. Sun visor for motor vehicles, comprising an oblong plate, in which one of the longitudinal sides of the plate comprises means for hingedly mounting the oblong plate to the vehicle, and a lighting unit carried by the plate, which lighting unit is disposed, when the plate is folded down to an essentially vertical position, to spread light at least backwards from the plate, characterized in that the plate (1) carries on said one longitudinal side (2) a lighting unit (4), which is shaped and disposed so that in the vertical position of the plate, it also spreads light forward from the plate, said lighting unit (4) extending over a substantial portion of the length of the plate (1) and having a thickness essentially equal to the thickness of the plate at the transition to the plate, so that the plate and the lighting unit form an integrated unit as regards shape, said lighting unit comprising a transparent hood and hood support means, said support means being attached to the plate and having snap fit means cooperating with complementary snap fit means on the hood so as to removably attach the hood to the support means.

4,999,747

FLASH HAIR PIN

Jiann Shyong Chen, No. 25, Sublane 99, Lane 274, Cong-Cheng S. Rd., Yung-Kang Shiang, Tainan Hsien, Taiwan

Continuation-in-part of Ser. No. 369,614, Jun. 21, 1989, Pat. No. 4,903,176. This application Feb. 7, 1990, Ser. No. 476,759
The portion of the term of this patent subsequent to Feb. 20, 2007, has been disclaimed.
Int. Cl.[5] F21L *1/00*
U.S. Cl. 362—103 1 Claim



1. A flash hair pin comprising:
a curved body made of resilient and translucent material, having a channel formed with at least a depression and a plurality of hollow projections or socket members having holes therein and extending inwardly, and an actuation member formed with a sharp-bent slot therein and adapted to swing inwards and outwards;
a bulb belt adapted to fit in the channel of the curved boy;
lug members formed within the channel for confining the bulb belt in the channel;
a plurality of flash bulbs evenly fitted in the belt and controlled by a circuit and powered by at least a battery accommodated in the depression in the curved body;
a switch connected in the integrated circuit for closing to energize the flash lights or open to distinguish the flash bulbs and mounted on the bulb belt at a position enabling access of the actuation member in the curved body to actuate the closing and open operations; and
a snap ring adapted to be engaged in the channel and positioned over the bulb belt and having pins extending outwardly and adapted for plugging into holes of the projections or socket members within the channel.

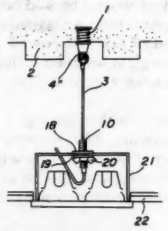
4,999,748

SYSTEM FOR SECURING ILLUMINATION INSTRUMENT

Takayuki Aoshika, 15-3, Asakusa 3-chome, Taito-ku, Tokyo, Japan

Filed Sep. 28, 1989, Ser. No. 413,624
Claims priority, application Japan, Sep. 30, 1988, 63-243894
Int. Cl.[5] F21S *1/02*
U.S. Cl. 362—147 8 Claims

1. A system for fixedly securing an illumination instrument to a ceiling of a building structure, comprising a flexible suspender adapted to be connected to an under surface of a slab of said building structure and extending generally vertically therefrom, a suspender grasping assembly for releasably grasping said flexible suspender to move therealong in a vertical direction and to be held at any desired height, and engaging means frictionally engaging with an outer periphery of said suspender grasping assembly to hold an illumination instrument support member at a temporal set position, said suspender grasping assembly including an upwardly-converging tapered bore within which a slider having a hollow extension extending in a longitudinal direction of the slider is contained to move along a vertical direction and normally biased upwards by a



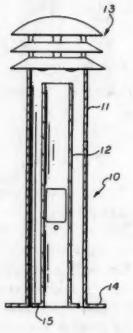
compression spring disposed within the bore, and plural clamping members disposed on an upper end of the slider movable in a radial direction along the tapered bore by a pushing force of the spring.

4,999,749

VANDAL RESISTANT BOLLARD LIGHT

Peter O. Dormand, 147 Rae Cres, Kotara South, Australia

Filed Sep. 5, 1989, Ser. No. 404,950
Int. Cl.[5] F21S *1/10*
U.S. Cl. 362—153.1 24 Claims



1. A bollard having mounted therein a light source, said bollard comprising:
a substantially vertical continuous outer tube having a plurality of portholes formed in an upper region thereof to allow light emission therethrough;
a cap assembly removably connected atop of said outer tube, and
a substantially vertical continuous inner tube independently mounted to said ground surface, said concrete plynth or the like, within said outer tube via a flange attached to or integral with a bottom end thereof, said inner tube having mounting means atop thereof to mount said light source.

4,999,750

FLASHLIGHT WITH ROTATABLE HEAD ASSEMBLY

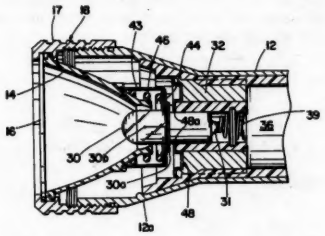
Richard J. Gammache, 1564 Mission Rd., Lancaster, Pa. 17601

Division of Ser. No. 382,401, Jul. 20, 1989, Pat. No. 4,914,555.
This application Mar. 12, 1990, Ser. No. 507,918
Int. Cl.[5] F21L *7/00*
U.S. Cl. 362—203 6 Claims

1. A flashlight comprising:
a casing containing at least one battery;
a bulb slidably disposed in a socket member carried in said

casing, said bulb having an annular flange forming an electrical terminal;

a head assembly rotatably mounted on one end of said casing and having means arranged for engaging said annular flange for moving said bulb in a first direction toward said battery and for moving said annular flange into contact with another electrical terminal in said casing thereby



closing an electrical circuit connecting said battery and said bulb in order to illuminate said bulb, said head assembly forming no part of said electrical circuit; and

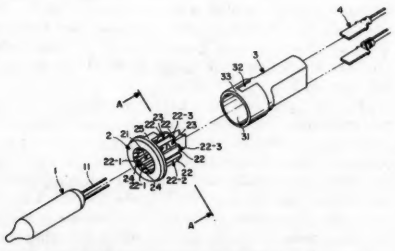
a spring disposed between said battery and said bulb for urging said bulb in a second direction away from said battery and for moving said annular flange out of contact with said another electrical terminal thereby opening said electrical circuit and extinguishing said bulb.

4,999,751

INNOVATIVE STRUCTURE OF CHRISTMAS LIGHT ASSEMBLY

Ming-Hsiung Chen, 7F, 16, Alley 3, Lane 227, Nung-An St., Taipei, Taiwan

Filed Sep. 5, 1989, Ser. No. 402,666
Int. Cl.[5] H01R *33/00*
U.S. Cl. 362—226 **3 Claims**



1. A Christmas light assembly, including:

a bulb with conductive wire ends set in a lamp base;

said lamp base being received in a lamp holder, said lamp base having an inner chamber comprising a plurality of divided strips forming a circular wall portion defining therein said inner chamber for receiving said bulb, and two resilient hook members integrally disposed at two opposite sides of said lamp base;

said lamp holder having an inner chamber for receiving said lamp base and comprising an upper flange; and

a pair of conductor terminals inserted in said lamp holder to connect with the conductive wire ends of said bulb respectively for electric power conduction;

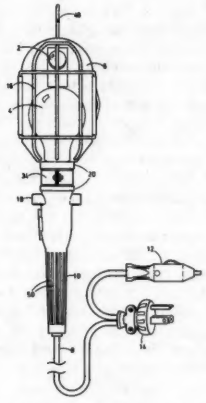
whereby when said bulb is received in said lamp base and said lamp base is set in said lamp holder, said divided strips are properly squeezed to let an inner diameter of the inner chamber of said lamp base be adjusted according to an actual outer diameter of said bulb to let said bulb be firmly retained by said lamp base, and said resilient hook members respectively engaged with said upper flange of said lamp holder to prevent said lamp base from separating from said lamp holder.

4,999,752

ELECTRIC LAMP WITH MULTIPLE POWER CONNECTORS

Jack Rogers, and James Sweet, both of P.O. Box 404, Hillsboro, Ohio 45133

Filed Dec. 6, 1989, Ser. No. 447,000
Int. Cl.[5] F21L *1/00*
U.S. Cl. 362—228 **5 Claims**



1. A trouble light fixture capable of both AC and DC operation, comprising:

a pair of lamps, said lamps including a first lamp capable capable of 110-VAC operation and a second lamp capable of 12-VDC operation;

a reflecting fixture, having a first end and a second end, said fixture being cylindrically shaped in the center;

a quarter-sphere formed at said first end of said fixture by the cylindrically shaped curve to form said quarter-sphere;

an aperture contained within the boundary of said quarter-sphere of the size and type required to house said second lamp;

means for securing to said first lamp formed at the second end of said fixture;

a hinged mask attached to said fixture to provide for protection of said lamps and allowing light to pass through said mask;

a cylindrically-shaped insulated handle, said handle having a first end and a second end;

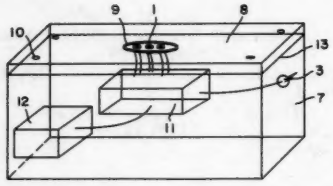
means for mounting said first lamp within said first end of said handle and fixedly attaching said first end of said handle to said second end of said fixture;

an electrical cord having a first end attached to said second end of said handle and a second end having means for providing power to both of said first and second lamps;

a set of receptacle adapters at the second end of said electrical cord capable of adapting to Ac and DC current receptacles required to provide said lamps with their respective required current; and

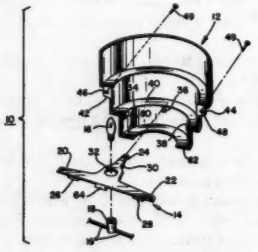
means for switching power to said first lamp contained within said handle.

4,999,753
PORTABLE SAFETY DEVICE
Robert MacKenzie, Marion Bridge, Canada, assignor to Bay Industrial & Mine Tech Inc., Canada
Filed Jan. 22, 1990, Ser. No. 468,364
Claims priority, application Canada, May 24, 1989, 600539
Int. Cl.[5] F21V *33/00*
U.S. Cl. 362—234 13 Claims



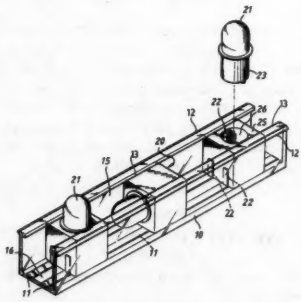
1. In a portable safety device for attracting visual attention comprising an array of flashing light sources, the improvement wherein said light sources comprise high intensity light-emitting diodes having a light output of at least 500 mcandela, and said light sources are connected in series with a solid state flashing circuit and a power supply, said power supply comprising a high energy battery and current limiting means in series therewith, said current limiting means comprising at least one resistor in series with a fuse, said high energy battery and said current limiting means being hermetically sealed and completely encapsulated in resin, said current limiting means preventing the current supplied by said power supply from exceeding a predetermined safe value, and said solid state flashing circuit being periodically switchable between a low resistance state wherein the voltage across the arrangement of high intensity light-emitting diodes exceeds a threshold voltage thereof, and a high resistance state wherein the voltage across the arrangement of high intensity light-emitting diodes falls below said threshold, whereby said high intensity light-emitting diodes flash brightly to provide a low current attention-attracting device visible at long range.

4,999,754
DECORATIVE SCONCE ASSEMBLY
Lonnie F. Gary, Lubbock, Tex., assignor to Gary Products Group, Inc., Lubbock, Tex.
Filed Nov. 2, 1989, Ser. No. 430,780
Int. Cl.[5] F21S *1/02*
U.S. Cl. 362—237 1 Claim



1. A sconce assembly adapted for use with a string of decorative lights comprising a plurality of decorative bulb and socket assemblies linked to a power supply by an electrical conductor, said sconce assembly comprising moldable polymeric shade and socket support members;
said socket support member further comprising an aperture adapted to receive and support said decorative bulb and socket assembly;
said shade member comprising a plurality of spaced-apart, substantially co-planar surfaces adapted to contact a substantially planar support surface, and means for attaching said shade member to said planar support surface;
means for providing sliding engagement between said shade member and said socket support member; and
means for restricting the sliding engagement between said shade member and said socket support member, so as to support and maintain said decorative bulb and socket assembly in substantially fixed relation to said shade member whenever said shade member is attached to said substantially planar support surface.

4,999,755
TUBE LIGHT
Tak-Huei Lin, P.O. Box 79-65, Taipei, Taiwan
Filed Jun. 7, 1990, Ser. No. 535,397
Int. Cl.[5] F21V *21/14*
U.S. Cl. 362—250 28 Claims

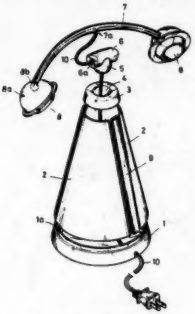


1. A tube light comprising:
a length of translucent insulating tube having an internal cross-section of substantially constant configuration, continuous electrical conductor strips disposed in a spaced and substantially parallel relationship along the length of the tube, the conductor strips being adapted to be connected with an electrical power source, the tube having a continuous opening of the same width along one side of the tube; and
a plurality of light units each having substantially the same size and general structure, and wherein each light unit has an external configuration substantially conforming to the internal cross-section of the tube to enable the light unit to be loaded into the tube, and each light unit being provided with a hole and contacts wherein the contacts have portions extending inside of the hole and outside of the light unit, the spacing of each contact portion extending outside of the light unit conforming to that of the conductor strips provided in the tube, and the spacing of each contact portion extending inside of the hole conforming to that of the bulb inserted into the hole.

4,999,756
DESK LAMP WITH ADJUSTABLE LIGHTS
Hsuan-Yu Lee, No. 18, Fun-Lin 1st. St., Sin-Hwa Chung, San-Chih Hsiang, Taipei Hsien, Taiwan
Filed May 29, 1990, Ser. No. 529,606
Int. Cl.[5] F21V *21/14*
U.S. Cl. 362—250 1 Claim

1. A desk lamp comprising a cone-shaped stationary base, a rotary head, and lamp housings disposed at opposite ends of a bow-shaped hollow arm which is attached to said rotary head, said cone-shaped stationary base further comprising a circular base member having a top portion smaller in diameter than a bottom portion which supports a cone-shaped reflective member made of a thin metal plate, a rotary head support member with a concave hole mounted on the top of said cone-shaped

reflective member, said rotary head further comprising a ball-shaped hollow portion formed integrally with a bow-shaped hollow portion such that said bow-shaped hollow arm passes through said bow-shaped hollow portion and said ball-shaped hollow portion forms a ball and socket connection with said concave hole of said rotary head support member so that said bow-shaped hollow arm can rotate 360 degrees in the horizontal direction and pivot in the vertical direction with respect to said cone-shaped stationary base, electrical wires passing through said cone-shaped stationary base, said rotary head and said bow-shaped hollow arm to said lamp housings, said lamp housing being disposed on said bow-shaped hollow arm with respect to said cone-shaped stationary base such that a portion of the light from said lamp housings is reflected by said cone-shaped reflective member.

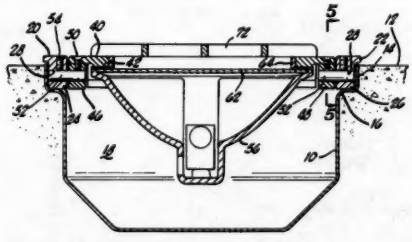


4,999,757

NICHE MOUNTED LIGHT FIXTURE

Charles B. Poppenheimer, La Canada-Flintridge, Calif., assignor to GTY Industries, Sylmar, Calif.

Filed Aug. 15, 1989, Ser. No. 394,360
Int. Cl.[5] F21Y *21/30*
U.S. Cl. 362—287 **15 Claims**



1. A niche mounted light fixture comprising:

a lamp housing sealed against water entry and having an outer periphery;

an inner ring fixed to said lamp housing about said outer periphery of said lamp housing;

an outer ring mounted about said inner ring and positionable in the niche to rotate therein;

a pivot assembly fixed between said inner ring and said outer ring and mounting said inner ring and said lamp housing to pivot relative to said outer ring in the niche, said pivot assembly including a lock to restrict pivotal movement of said inner ring relative to said outer ring, said lock being mounted on said outer ring, and removable fasteners, said inner ring being mounted to said pivot assembly by said removable fasteners and wherein said lamp housing and said inner ring may be removed from said niche and said outer ring;

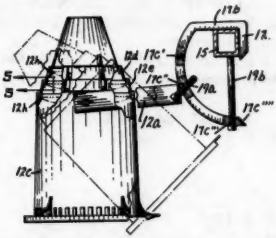
a lock assembly operably mounted to said outer ring to selectively lock said outer ring in the niche.

4,999,758

LAMP HOUSING

Randal L. Wimberly, R. 1, 122 Peck Ct., P.O. Box 132, Ledbetter, Ky. 42058

Filed Feb. 21, 1989, Ser. No. 312,456
Int. Cl.[5] F21V *21/08, 17/04*
U.S. Cl. 362—373 **11 Claims**



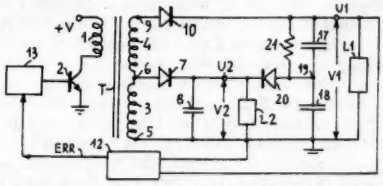
1. A lamp housing having a body flaring outwardly from one end to another end, spacer means disposed on the inner surface of said body proximate said another end engaging a lamp and serving ventilation purposes between said lamp and said inner surface, and flexible latching means disposed around said body at said another end in a retaining relationship with a portion of said lamp, where said flexible latching means are disposed within concentric rows accommodating different sized lamps.

4,999,759

MULTIPLE OUTPUT SWITCHING POWER SUPPLY HAVING ONE CONTROLLED OUTPUT VOLTAGE AND LOAD COMPENSATION

Gian P. Cavagnolo, Via Caterina da Forlì 28, Milano 20100, and Alessandro Scotti, Via Genova 23, 20010 Pregnana Milanese, both of Italy

Filed Jul. 20, 1990, Ser. No. 556,608
Claims priority, application Italy, Sep. 27, 1989, 21840 A/89
Int. Cl.[5] H02M *3/335*; G05F *1/577*
U.S. Cl. 363—21 **2 Claims**



1. A multiple output switching power supply providing a first directly controlled output voltage between a first output and ground and indirect control of at least a second output voltage between a second output and ground, comprising a transformer having at least a primary winding and at least two secondary windings, periodical voltage pulses being induced in said secondary windings, said voltage pulses loading, through rectifying elements, a first capacitive element, having a grounded terminal, at a first voltage V1 and a second capacitive element, having a grounded terminal, at a voltage V2 having the same polarity as V1 but having a lower value, said voltages being available, for powering loads, respectively at said first output and at said second output, said power supply being characterized in that:

said first capacitive element comprises a first and a second capacitor, series connected between said first output and ground, the node common to said first and said second capacitor being connected to said second output through a diode, said first and second capacitors having a value such that said first voltage applies to said node a voltage level equal or slightly higher, in absolute value, than said second voltage, said diode being conductive in the direction which allows power flow from said first capacitive

element to said second output terminal and said second capacitive element.

4,999,760

HIGH VOLTAGE RECTIFIER AND ASSOCIATED CONTROL ELECTRONICS

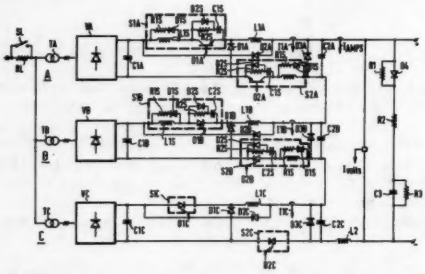
Roel Tietema, Venlo, Netherlands, assignor to Hauzer Holding B.V., Venlo, Netherlands

Filed Dec. 12, 1989, Ser. No. 449,648

Claims priority, application European Pat. Off., Feb. 20, 1989, 89102893

Int. Cl.[5] H02H *7/125*

U.S. Cl. 363—53 **12 Claims**



1. High voltage rectifier, in particular for use as a bias voltage supply in vacuum processes such as PVD coating processes, comprising an input transformer and also subsequent rectification, smoothing and switching units and also an arrangement for switch control in dependence on occurring overcurrents, characterised in that in each case, a rectifier (VA, VB, VC) fed from a secondary transformer winding is combined with a subsequent smoothing capacitor (C1A, C1B, C1C), with a first switch (S1A, S1B, S1C) serving as a DC converter for regulation of the output voltage, with a choke (L1A, L1B, L1C) serving for smoothing of the current ripple and also a capacitor (C2A, C2B, C2C) intended for smoothing of the output voltage, and with a second switch (S2A, S2B, S2C) controlled in dependence on occurring overcurrents into a rectifier stage (A, B, C) across the output of which there is connected a recovery diode (D3A, D3B, D3C); and in that the smoothing chokes (L1A, L1B, L1C) can be switched over by the respective second switch (S2A, S2B, S2C) to a first recovery circuit (S1A, L1A, D2A; S1B, L1B, D2B; S1C, L1C, D2C), wherein, prior to each switching off of the respective second switch (S2A, S2B, S2C) the associated first switch (S1A, S1A, S1C) is brought into the conductive state for a predetermined short period of time and is then switched off.

4,999,761

INTEGRATED DUAL CHARGE PUMP POWER SUPPLY AND RS-232 TRANSMITTER/RECEIVER

David Bingham, San Jose, and Charles M. Allen, Sunnyvale, both of Calif., assignors to Maxim Integrated Products, Sunnyvale, Calif.

Continuation of Ser. No. 271,160, Nov. 14, 1988, Pat. No. 4,897,774, which is a continuation of Ser. No. 13,648, May 12, 1987, Pat. No. 4,809,152, which is a continuation of Ser. No. 878,233, Jun. 25, 1986, Pat. No. 4,679,134, which is a continuation of Ser. No. 782,953, Oct. 1, 1985, Pat. No. 4,636,930. This application Oct. 10, 1989, Ser. No. 418,493

Int. Cl.[5] H02M *3/18*

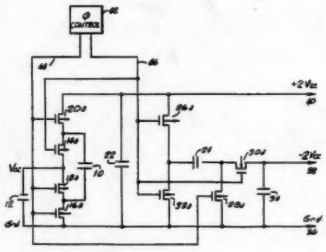
U.S. Cl. 363—60 **68 Claims**

1. A CMOS integrated single-chip voltage supply comprising:

a means adapted to be connected to a supply voltage for charging a capacitor approximately to a supply voltage;

a means for coupling said charged capacitor in series with said supply voltage to create a source of positive voltage approximately double the supply voltage;

a means for inverting said doubled voltage and making it available on the same chip, thereby providing a source of



two available supply voltages on the same chip, one being a positive voltage approximately two times said supply voltage, and the other being a negative voltage approximately two times said supply voltage; and

a means for inhibiting latch-up of four-layer diode devices inherently formed in CMOS integrated circuits.

4,999,762

HIGH VOLTAGE POWER SOURCE DEVICE

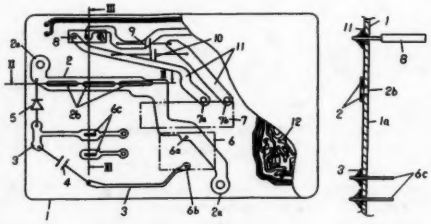
Kazuho Sakamoto, Soraku; Takashi Niwa, Nara; Haruo Suenaga, Soraku, and Takahiro Matsumoto, Nara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 27, 1990, Ser. No. 500,254

Claims priority, application Japan, Mar. 27, 1989, 1-75314

Int. Cl.[5] H02M *1/00*

U.S. Cl. 363—144 **4 Claims**



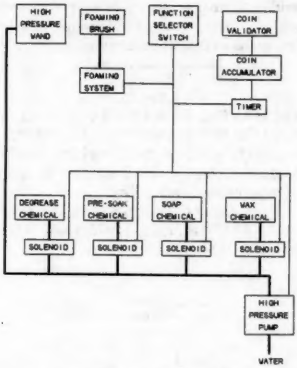
1. A high voltage power source device which comprises a printed circuit board having a low voltage circuit and a high voltage circuit formed respectively on separate areas of the printed circuit board; and a patterned grounding conductor formed in the printed circuit board at the boundary between the separate areas, said printed circuit board having a plurality of openings defined therein so as to extend completely through a thickness of the printed circuit in alignment with the patterned grounding conductor.

4,999,763

SELF SERVICE ACCESS CONTROLLER

Jeffrey J. Ousborne, 6708 Bushranger Path, Columbia, Md. 21046

Filed Apr. 25, 1988, Ser. No. 186,032
Int. Cl.[5] G05B *19/00*; B60S *3/04*
U.S. Cl. 364—140 10 Claims



1. A computer controlled system providing customer access to, control and monitoring of self service equipment providing respective car wash functions within a car wash facility which includes at least one car wash bay, the system comprising:

a computer;

means coupled to said computer for allowing a customer to select and to change specific ones of the car wash functions thereby defining a car wash cycle;

means to implement access, control and monitoring functions in the computer;

a plurality of respective apparatuses for respectively providing the respective carwash functions; and

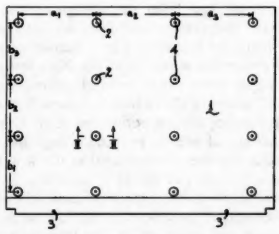
means coupled to the computer and responsive to signals therefrom for enabling specific ones of said apparatuses for providing selected ones of the car wash functions in accordance with the defined car wash cycle.

4,999,764

METHOD OF SETTING UP APPARATUS FOR HANDLING ELECTRICAL OR ELECTRONIC COMPONENTS

Steven J. H. Ainsworth, and Derek R. Dane, both of Colchester, England, assignors to Emhart Inc., Towson, Md.

Filed Jan. 11, 1989, Ser. No. 295,968
Claims priority, application United Kingdom, Jan. 28, 1988, 8801896; May 12, 1988, 8811253
Int. Cl.[5] G05B *1/06*
U.S. Cl. 364—167.01 2 Claims



1. A method of setting up a component placement machine comprising a pick-up head having a pick-up tool, an X-Y table on which substrates on which components are to be placed may be mounted, and a control system for the X-Y table comprising the steps of:

(a) mounting a setting-up plate, provided with an array of fiducial marks having accurately known X-T coordinates relative to the plate, in an accurately known position on the X-T table by means of aligning location points of the X-Y table and the setting up plate,

(b) inputting into the control system said known X-Y coordinates of said fiducial marks in the array,

(c) causing said control system to sequentially locate each fiducial mark at a known position,

(d) locating a camera having a field of view defined by an X-Y array of pixels so that the X-Y array of pixels is oriented to correspond to the X-Y array of fiducial marks and so that a selected pixel will see said known position,

(e) for each fiducial mark located at said known position, determine the actual pixel which locates said fiducial mark and determine the number of pixels in the X line of pixels and in the Y line of pixels required to relocated that pixel to said selected pixel, and

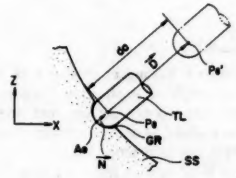
(f) defining based on such number of pixels, X-Y corrections for said control system when locating the X-Y table.

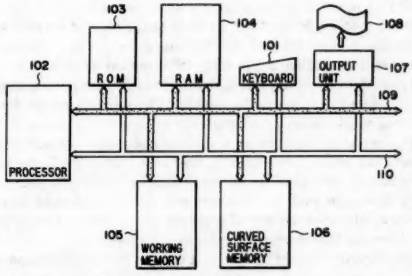
4,999,765

METHOD OF CREATING NC DATA FOR GROOVING

Masaki Seki, Tokyo; Koji Samukawa, and Osamu Hanaoka, both of Yamanashi, all of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP88/00723, § 371 Date Mar. 7, 1989, § 102(e) Date Mar. 7, 1989, PCT Pub. No. WO89/01196, PCT Pub. Date Feb. 9, 1989
PCT Filed Jul. 20, 1988, Ser. No. 320,092
Claims priority, application Japan, Jul. 30, 1987, 62-191373
Int. Cl.[5] G06F *15/46*
U.S. Cl. 364—191 8 Claims





1. A method of using a memory and a processor for creating NC data which is used to perform grooving by moving a tool along a cutting groove curve on a three-dimensional surface and by withdrawing the tool a designated distance from the three-dimensional surface at an end point of grooving, comprising the steps of:

storing in the memory surface data including the three-dimensional surface and curve data including the cutting groove curve;

creating grooving NC data in the processor for performing grooving machining based upon the stored surface data and the curve data;

calculating in the processor a unit normal vector at the end point;

calculating in the processor a movement vector by multiplying the designated distance by said unit normal vector; and

creating withdrawal NC in the processor for withdrawing the tool from the end part of grooving, based upon said movement vector.

4,999,766

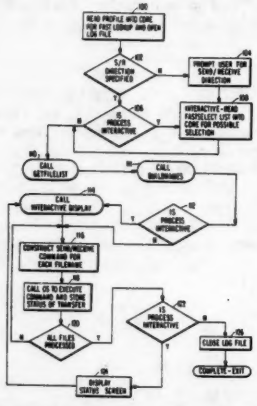
MANAGING HOST TO WORKSTATION FILE TRANSFER

Anthony M. Peters, Bedford, and Mark A. Sehorne, Grapevine, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 13, 1988, Ser. No. 205,969

Int. Cl.[5] G06F *15/16*

U.S. Cl. 364—200 **6 Claims**



1. In a data processing system having at least a first host computer and a second host computer, each of said host computers comprising memory, data storage devices and one or more attached display devices, said first host computer running under a first operating system and said second host computer running under a second operating system different type from said first operating system, and a workstation constituting one of said display devices for each of said first and second host computers, said workstation having a memory, a display, a keyboard including a plurality of function keys and a data storage device with a resident profile table comprising appropriate data structures and names for files on the storage device of said workstation corresponding to respective files on storage devices of each of said first and second host computers operating under, respectively, said first and second operating systems, a method of transferring files between said data storage device of said workstation and one of said data storage devices of a selected one of said first or second host computers comprising the computer performed steps of:

displaying a select screen to a user of said workstation and processing user selection inputs to display said user selection inputs on said select screen, said user selection inputs including for each file to be transferred a send or receive transfer operation, the file to be transferred and a selection of one of said first or second host computers;

accessing said profile table to read an appropriate data structure and file name for each file to be transferred to or from a data storage device of a selected host computer and to generate default inputs for a file transfer, said default inputs including filenames with attributes, said filenames with attributes being displayed on said select screen for user verification and/or modification;

building a local file transfer list at said workstation when files are to be transferred to a selected host computer from said workstation and accessing a terminal emulator to get files when files are to be transferred from a host computer to said workstation; and

invoking a file transfer program to transfer each of said files with said appropriate data structure and file name to or from said data storage device of said workstation from or to one of said data storage devices on the selected one of said first or second host computers.

4,999,767

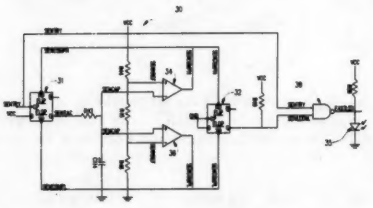
SYSTEM HAVING CUP OPERATION AL ERROR WARNING FACILITY USING VISUAL INDICATOR AND REAL-TIME CLOCK INTERRUPT ROUTINE

Michael D. Durkin, Austin, Tex., assignor to Dell Corporate Services Corporation, Austin, Tex.

Filed Jan. 12, 1989, Ser. No. 296,719

Int. Cl.[5] G06F *11/28, 11/32;* G08B *5/38*

U.S. Cl. 364—200 **4 Claims**



1. An electronic digital computer system having a warning facility, comprising:

(a) central processing means for performing digital operations and for providing a real time clock interrupt routine which develops a periodic pulse;

(b) signal generating means, responsive to continuing operation of the central processing means, comprising register means, connected to the central processing means to receive the periodic pulse, to provide a bi-level electronic signal in response thereto, resulting from such continuing operation; and

(c) indicator means, comprising a visual indicator, responsive to the bi-level electronic signal, with a first state indicating continuing operation of the central processing means and a second state indicating interrupted operation of the central processing means, wherein the indicator means further comprises first detector means for detecting the high level of the bi-level electronic signal, and second detector means for detecting the low level of the bi-level electronic signal, and wherein the first and second detector means comprise a high comparator and a low comparator, respectively, configured so that the high comparator provides a low output signal when the bi-level electronic signal is at the low level, and a high output signal when the bi-level electronic signal is at the high level, and the low comparator provides a low output signal when the bi-level electronic signal is at the high level and a high output signal when the bi-level electronic signal is at the low level, wherein the indicator means further comprises an input flip-flop circuit connected to receive the bi-level electronic signal and to provide a high output signal in response to the electronic signal at the low level, and to provide a low output signal in response to the be-level electronic signal at the high level, and an output flip-flop circuit connected to be reset by the low output of the high comparator and to be set by the low output of the low comparator and having an output that is gaited with the electronic signal.

4,999,768

DATA TRANSFER CONTROL UNITS EACH OF WHICH COMPRISES PROCESSORS AND DUAL-PART MEMORY

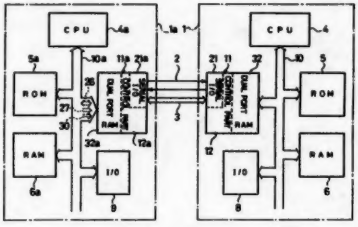
Masayuki Hirokawa, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 160,031, Feb. 24, 1988, abandoned. This application May 16, 1990, Ser. No. 524,677

Claims priority, application Japan, Apr. 14, 1987, 62-91194

Int. Cl.[5] G06F *13/16, 13/38, 15/16*

U.S. Cl. 364—200 **4 Claims**



1. A data transfer control system including a plurality of transfer control units capable of transferring data directly between themselves and between one of the transfer control units and an outside source, comprising:

a first transfer control unit including,

a first processor for controlling operations within said first transfer control unit;

a first data transfer interface, connected to said first processor by a first system bus, said first data transfer interface for interfacing said first transfer control unit with other individual transfer control units in the plurality of transfer control units and said first transfer control unit with an outside source, said first data transfer interface including,

a second processor for controlling the transfer of data into and out of said first data transfer interface;

a first input/output interface unit for interfacing said first transfer control unit with another one of the plurality of transfer control units;

a first bus interface connected to said first system bus for interfacing said first data transfer interface to said first processor; and

a first dual port memory having a dual port configuration including a first port and a second port, wherein said first dual port memory stores information and transfers information between said first transfer control unit and another one of the plurality of transfer control units through said first port and said first I/O interface unit or an outside source through said second port and said first bus interface;

a second transfer control unit including,

a third processor for controlling operations within said second transfer control unit;

a second data transfer interface, connected to said third processor by a second system bus, said second data transfer interface for interfacing said second transfer control unit with other individual transfer control units in the plurality of transfer control units, including said first transfer control unit, and said second transfer control unit with an outside source, said second data transfer interface including,

a fourth processor for controlling the transfer of data into said second transfer control unit from said first transfer control unit or an outside source and from said second data transfer interface to said first transfer control unit, another one of the plurality of transfer control units or an outside source;

a second input/output (I/O) interface unit for interfacing said second transfer control unit with said first transfer control unit or another one of the plurality of transfer control units;

a second bus interface connected to said second system bus for interfacing said second data transfer interface to said third processor; and

a second dual port memory having a dual port configuration including a third port and a fourth port, wherein said second dual port memory stores information and transfers information between said second transfer control unit and said first transfer control unit or one of the other plurality of transfer control units through said third port and said second I/O interface unit, or an outside source through said fourth port and said second bus interface.

4,999,769

SYSTEM WITH PLURAL CLOCKS FOR BIDIRECTIONAL INFORMATION EXCHANGE BETWEEN DMA CONTROLLER AND I/O DEVICES VIA DMA BUS

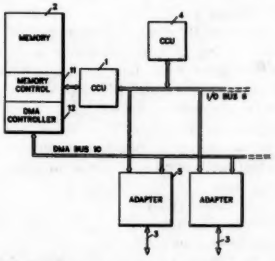
Michel Costes, Cagnes S/Mer; Alain Gach; Yves Hartmann, both of Vence, and Michel Peyronnenc, St Jeannet, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 20, 1988, Ser. No. 197,736

Claims priority, application European Pat. Off., Aug. 20, 1987, 87480007.1

Int. Cl.[5] G06F *13/28*

U.S. Cl. 364—200 **13 Claims**



1. An interface mechanism for controlling the exchange of information between first and second devices through a bus comprising a plurality of lines, characterized in that said interface mechanism comprises:

in the first device, first clock generating means (32,34) providing a first clock signal and sending it to the second device through a first clock line of the bus,

in the second device, first clock signal receiving means (34,38) connected to said first clock line for receiving the first clock signal and deriving a second clock signal therefrom, and sending it to the first device through a second line of the bus,

in the first device, second clock receiving means connected to said second line for receiving the second clock signal,

in the first device, first control and sampling means (22,51,200) which are responsive to a transfer request signal sent on a request line (44) of the bus by the second device to send a grant signal on a grant line (46) of the bus, when the request may be serviced by the first device and which are responsive to a transfer control signal (R/W 62) sent by the second device through the bus, said signal being indicative of the direction of the transfer to send data on data lines of the bus under control of the first clock signal when the transfer control signal indicates that the transfer is to be performed from the first device to the second device or to sample data received from the data lines of the bus under control of the second clock signal received by the second receiving means when the transfer

is to be performed from the second device to the first device,

in the second device, second control and sampling means (9,56,54) which are responsive to the grant signal received from the first control and sampling means and to the transfer control signal to send data to the first device through the data lines under control of the second clock signal when the transfer control signal indicates that the transfer is to be performed from the second device to the first device and sample the data received from the first device through the data lines under control of the first clock signal received by the first clock signal receiving means when the transfer control signal indicates that the transfer is to be performed from the first device to the second device, wherein said bus comprises n data bidirectional lines to carry in parallel m k-bit bytes with n=mk,

and in which the first and second clock signals have the same period and are out of phase,

wherein the first device is a direct memory access controller (12) in a system which controls the exchange of information between a central unit and input/output devices (3) through memory means (2,11) which stores data k-bit bytes received from the input/output devices through the data lines of the bus (10) and the second device is a selected one of the input/output devices, characterized in that:

the second control and sampling means comprises:

bus driving means (504)

bus receiving means (500)

parameter generating means (508,504) which are responsive to the grant signal for initiating the sending of transfer control parameter bytes through the data lines under control of the second clock signal, said parameter bytes comprising at least one count byte indicative of the count of bytes in the data burst to be transferred and at least one address byte indicative of the starting address in the memory means where the burst to be transferred to the second device is stored or where the burst received by the first device is to be stored, and

the first control and sampling means comprises:

bus driving means (138)

bus receiving means (124)

data register means (120)

address register means (122)

means (306,308,324,122,120) for sampling and loading the count byte(s) into the data register means and the address byte(s) into the address register means under control of the second clock signal, so as to use them to control the subsequent data bytes transfer;

means (406,408) for generating a turn around signal on a turn around line (64) of the bus, when the data transfer may be initiated so as to activate the bus receiving or driving means in such a way that the data may be received from the bus or sent to the bus depending upon said transfer control signal, the turn around signal being sent to the second sampling and control means to activate the bus receiving or driving means in the said second sampling means depending upon said transfer control signal.

4,999,770

COMMAND CONTROLLED MULTI-STORAGE SPACE PROTECTION KEY PRETESTING SYSTEM PERMITTING ACCESS REGARDLESS OF TEST RESULT IF SELECTED KEY IS PREDETERMINED VALUE

Mari Ara, Isehara; Hideo Sawamoto, Hadano, and Kaname Imai, Hadano, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Aug. 11, 1987, Ser. No. 84,092

Claims priority, application Japan, Sep. 19, 1986, 61-221366

Int. Cl.[5] G06F *12/14, 12/10*

U.S. Cl. 364—200 **12 Claims**

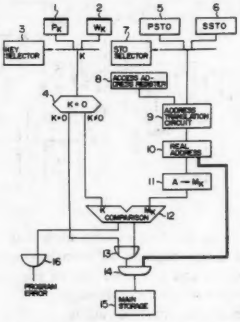
1. A data processing system for multi-address space control wherein when a main storage is to be accessed from a processor, a main storage protection is conducted by comparing by a comparator an access key output by said processor with a main storage key provided in the main storage, comprising:

a first key register for storing a program status word key output by said processor;

a second key register for storing an access key output by said processor in accordance with a data transfer instruction;

a selector for selecting one of said first and second key register under control of said processor independently from storage access type;

judging means coupled to said selector for judging whether



a key selected by said selector is a predetermined value, allowing said processor to access said main storage irrespective of a value of said main storage key when the value of said selected key matches said predetermined value, and for comparing the value of said selected key to said main storage key; and

pretesting means including a microprogram for executing a predetermined pretesting procedure, for setting said predetermined value in said second key register as a key for pretesting a data transfer between a plurality of address spaces when a key included in a transfer instruction coincides with said main storage key.

4,999,771

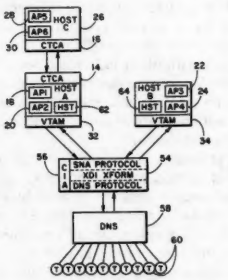
COMMUNICATIONS NETWORK

John T. Ralph, Mission Viejo, Calif.; Guy B. Beckley, Sequim, Wash.; Frank T. Brady, Pomona; Ivan Jelenek, Northridge; Darryl K. Korn, Laguna Beach; John Meyer, Irvine; Daniel L. Nay, Rancho Palos Verdes; Colin M. Searle, Buena Park; David Shick, Mission Viejo, all of Calif.; Richard W. Williams, Atlanta, Ga., and Jon C. Wilson, deceased, late of Los Angeles, Calif. (by Eva Wilson, executrix), assignors to Control Data Corporation, Minneapolis, Minn.

Filed Aug. 31, 1987, Ser. No. 91,175

Int. Cl.[5] G06F *13/00*

U.S. Cl. 364—200 **6 Claims**



1. In a data communications system including a first host

group of at least one first host computer operating on bit-encoded data according to a first format; a second host group including at least one second host computer operating on bit-encoded data according to a second format incompatible with the first format; a plurality of user terminals; an interface means connected to the first and second host groups, said interface means including data transforming means and protocol establishing means, and further including an interface memory means, said interface memory means containing application program information identifying application programs available in the individual ones of the host processors; a communications processor means connected to the terminals, operating on bit-encoded data according to a third format and including a transmission path selection means; and a plurality of data busses connecting the interface means and the communications processors means to provide a plurality of data transmission paths; a method of transmitting data messages between the host groups and the terminals, including the steps of:

a. utilizing the communications processor means to assign data messages to the host processors, based upon the application program information from said interface means;

b. transmitting data messages in the first format between the first host group and the interface means;

c. transmitting data messages in the second format between the second host group and the interface means;

d. upon receiving data messages from the first and second host groups at the interface means, establishing protocol among the data messages and transforming the data messages from the respective first and second formats into the third format for subsequent transmission between the interface means and the data busses;

e. transmitting data messages in the third format between the interface means and the communications processor means via the busses, and further transmitting data messages between the communications processor means and the terminals; and

f. upon receiving data messages from the busses at the interface means, establishing protocol among the data messages and transforming the data messages from the third format into one of the first and second formats, the format to which each data message is transformed corresponding to the one of said first and second host groups to which the message is to be sent.

4,999,772

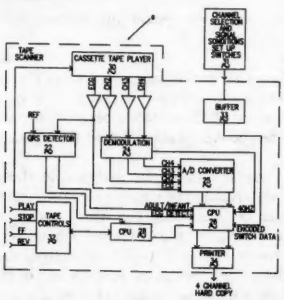
SLEEP SCREENING SYSTEM WITH TIME BASED MODULATED DATA

Bruce R. Bowman, Eden Prairie; Michael R. Oran, Chasks, and Gary J. Syring, Lakeville, all of Minn., assignors to Eden Tec Corporation, Eden Prairie, Minn.

Filed Jan. 24, 1989, Ser. No. 301,233

Int. Cl.[5] G06F *15/42;* A61B *5/0205*

U.S. Cl. 364—413.05 **13 Claims**



1. Cardio respiratory monitoring apparatus comprising:

(a) means for receiving n physiologic input signals from a plurality of transducers coupled to a study subject including at least an electrocardiographic (ECG) signal, a pulse signal, a plethysomographic signal, and an oximetry signal and an impedance respiration signal;

(b) a clock source;

(c) means coupled to said clock source for producing a periodic time base signal in the range of 20 to 40Hz;

(d) means for modulating said impedance respiration signal with said time base signal;

(e) means for selectively modulating said pulse signal with said oximetry signal; and

(f) means for recording each of said physiologic input signals and said modulated time base signal on n−1 data tracks.

4,999,773

TECHNIQUE FOR CONTOURING AMPLITUDE OF MUSICAL NOTES BASED ON THEIR RELATIONSHIP TO THE SUCCEEDING NOTE

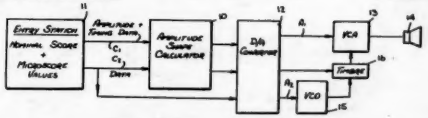
Manfred Clynes, Queen's College, University of Melbourne, Parkville, 3052, Australia

Continuation of Ser. No. 56,411, Jun. 1, 1987, Pat. No. 4,763,257, which is a continuation of Ser. No. 552,075, Nov. 15, 1983, Pat. No. 4,704,682. This application Aug. 2, 1988, Ser. No. 227,108

The portion of the term of this patent subsequent to Nov. 10, 2004, has been disclaimed.

Int. Cl.[5] G10F *1/00;* G10H *7/00*

U.S. Cl. 364—419 **8 Claims**



1. A technique for imparting an emotionally expressive microstructure to the respective notes in the score of a musical composition constituted by successive notes whose notation gives the nominal value for each note in regard to its pitch and duration, said technique comprising the steps of:

(A) entering into a digital computer data representing the nominal pitch and duration of each of the successive notes in the musical score to be processed therein;

(B) processing the notes in the computer to contour the amplitude of each note in accordance with its relationship to the succeeding note in the score; and

(C) generating and audibly reproducing tones representing the amplitude-contoured notes in the processed score to impart expression to the reproduced music derived therefrom.

4,999,774

SPEED RATIO CONTROL SYSTEM AND METHOD FOR A CONTINUOUSLY VARIABLE TRANSMISSION FOR A VEHICLE

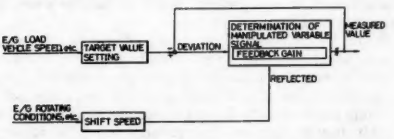
Setsuo Tokoro; Tomoyuki Watanabe; Takashi Hayashi, all of Susono, and Takashi Shigematsu, Mishima, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed May 28, 1986, Ser. No. 867,443

Claims priority, application Japan, May 28, 1985, 60-115055

Int. Cl.[5] B60K *41/08;* G05D *17/02*

U.S. Cl. 364—424.1 **10 Claims**



1. In a speed ratio control system for a continuously variable transmission for a vehicle, wherein a speed ratio is feedback-

controlled so that said speed ratio can be continuously varied and adjusted, the improvement comprising:

means for setting a target shift speed, said target shift speed being set in accordance with at least a value indicative of a rotating condition of an engine of said vehicle;

means for setting a gain of said feedback control in accordance with said target shift speed; and

means for using said gain to determine the size of the adjustment of the speed ratio.

4,999,775

POWER APPARATUS FOR DIAGNOSING AIR BAG EQUIPMENT

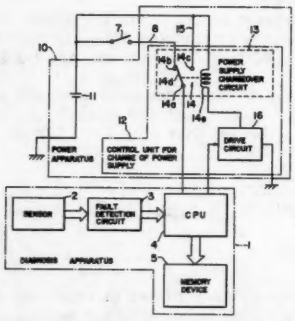
Kunihiko Muraoka, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 2, 1989, Ser. No. 346,535

Claims priority, application Japan, May 11, 1988, 63-62451

Int. Cl.[5] B60R *21/32*

U.S. Cl. 364—424.03 **11 Claims**



1. An apparatus for diagnosing faults in an air bag equipment mounted on a vehicle and having a battery, an ignition key switch connected to the battery, sensing means for sensing the condition for operating the air bag equipment, and fault detection means for detecting a fault occurring in the sensing means and for producing a fault detection signal, comprising:

a central processing unit for determining a first fault occurrence and for producing a first fault occurrence signal in response to the fault detection signal; and

control means for applying a power of the battery to said central processing unit in dependency on closing the ignition switch before the faults occur and for maintaining to apply the power of the battery to said central processing unit regardless the conditions of the ignition switch in response to said first fault occurrence signal.

4,999,776

METHOD AND APPARATUS FOR DETERMINING THE CENTER POSITION OF A VEHICULAR STEERING SYSTEM

Michael W. Soltis, Livonia, and Sam M. Mackool, Berkley, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Nov. 30, 1989, Ser. No. 443,974

Int. Cl.[5] B62D *15/00*

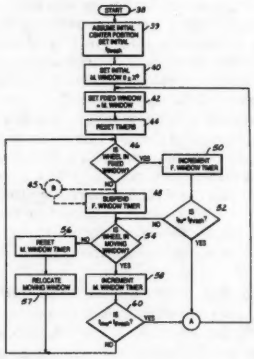
U.S. Cl. 364—424.05 **29 Claims**

21. A method for adjusting the center position of a vehicular steering system from a predetermined position to a new position, comprising the steps of:

defining two windows of operation of said steering system, said windows comprising a first relatively movable window having a location which generally tracks the instantaneous position of said steering system and a second relatively fixed window having a location which is resettable only after at least one time dependent condition has been satisfied;

recording the amount of time said steering system is operated within said movable window, but nulling the accumulated time whenever said steering system is operated outside of said movable window;

recording the amount of time said steering system is operated within said fixed window, but suspending the accumulation of time whenever said steering system is operated outside of said fixed window; and



adjusting the position of said predetermined center to a new position whenever either of the recorded time values is equal to a first threshold period.

4,999,777

ACTIVE SUSPENSION SYSTEM

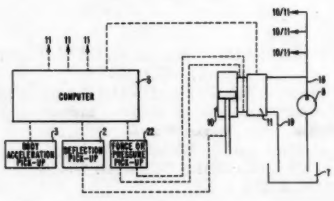
Robert Schussler, Stuttgart, and Bernd Acker, Esslingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Filed May 30, 1989, Ser. No. 358,406

Claims priority, application Fed. Rep. of Germany, May 28, 1988, 3818188

Int. Cl.[5] B60G *17/00*

U.S. Cl. 364—424.050 **19 Claims**



1. An active suspension system for a motor vehicle comprising

a computer,

actual-value pick-ups assigned to wheels of the vehicle, each of the pick-ups operatively arranged to generate a signal representative of the distance between the vehicle body and the respective wheel and feed the signal to the computer,

spring and support assemblies assigned to the wheels and operatively arranged to provide supporting forces and/or resistances counteracting the lifting movements of the wheels controlled by the computer, wherein the computer is operatively arranged to determine from the signals of the actual-value pick-ups an actual value of the averaged ground clearance, an actual value of the averaged roll angle and an actual value of the averaged pitch angle of the vehicle body and to actuate the spring and support

assemblies as a function of the deviations of the actual values from set values, such that the total correction of the supporting forces and/or resistances effected by the computer has a value which corresponds essentially to the sum of those values which the computer would effect for the correction of the averages ground clearance alone and for the correction of the pitch angle alone and for the correction of the roll angle alone, and the computer is operatively arranged to actuate the supporting forces and/or resistances such that forces of the spring and support assemblies affecting rolling movements of the vehicle body can be applied by the spring and support assemblies of the front and rear wheels at predeterminable proportions to achieve a steerage tendency of the vehicle including understeering, oversteering and a neutral behavior.

4,999,778

METHOD AND APPARATUS FOR DETERMINING SLIP THRESHOLDS FOR A PROPULSION SLIP CONTROL SYSTEM OF A MOTOR VEHICLE

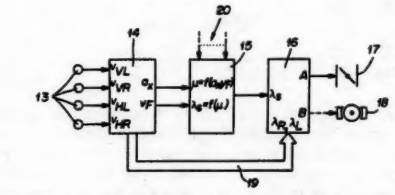
Thomas Ruhl, Waiblingen-Hegnach; Armin Müller, Backnang, and Wolfgang Hinrichs, Stuttgart, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Filed Dec. 5, 1988, Ser. No. 280,000

Claims priority, application Fed. Rep. of Germany, Dec. 5, 1987, 3741248

Int. Cl.[5] B60T *8/32*

U.S. Cl. 364—426.02 **3 Claims**



1. Method of determining a slip threshold for actuating a propulsion slip control of a multi wheeled motor vehicle to prevent undesirable slipping of driven wheels of said motor vehicle by comparison of a slip of said driven wheels with an appropriate predetermined slip threshold value, including the following steps:

sensing circumferential speed of each of the vehicle wheels and producing a vehicle speed signal and a vehicle acceleration signal;

determining the said slip of the said driven wheels utilizing the sensed vehicle speed signal;

determining the predetermined slip threshold value by creating a specific curve through plotting a coefficient of friction (μ) between said driven wheels and a roadway as a function of attainable acceleration (a_x) of the vehicle from vehicle standstill (V_F=0) and said vehicle speed (V_F) signal, with resistances to vehicle motion being taken into consideration in creating the specific curve;

utilizing the said specific curve to form a graph of the said coefficient of friction (μ) as a function of the said vehicle speed (V_F) signal and said attainable acceleration (a_x) signal to obtain said appropriate predetermined slip threshold value (λ_s) based on the coefficient of friction (μ) determined from the graph;

comparing a slip signal of each said driven vehicle wheel with the appropriate predeterminable slip threshold value (λ_s) determined above; and

actuating the propulsion slip control on the basis of said comparison to control a drive torque of the vehicle.

4,999,779

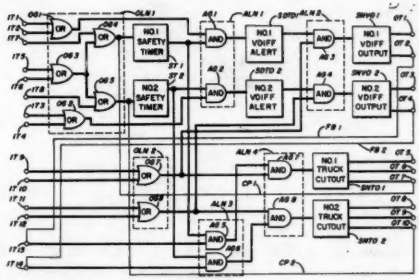
AXLE HEALTH DISCRIMINATORY SAFETY TIMER ARRANGEMENT FOR CONTROLLING WHEEL SLIP ON A MULTIPLE-AXLE RAILWAY VEHICLE

James A. Wood, Spartanburg, and John W. Drake, Greenville, both of S.C., assignors to American Standard Inc., Spartanburg, S.C.

Filed Sep. 18, 1989, Ser. No. 408,822

Int. Cl.[5] G06F *7/70*

U.S. Cl. 364—426.03 **30 Claims**



1. An axle health discriminatory safety timer arrangement for a braking system of a multiple-axle vehicle comprising, a first logic network having a plurality of inputs responsive to the operational conditions on the vehicle, the output of said first logic network being connected to the input of a pair of safety timers, the output of said pair of safety timers being connected to the input of a second logic network, the output of said second logic network being connected to the input of a pair of speed difference threshold detection sensors, the output of said pair of speed difference detection sensors being connected to the input of a third logic network, the output of a pair of output logic network being connected to the input of a pair of output circuits, the output of said pair of safety timers also being connected to the input of a fourth logic network, the output of a fifth logic network being connected to the input of said third logic network and also being connected to the input of a sixth logic network, and the output of said sixth logic network being connected to the input of a pair of truck cutout circuits for nullifying the slip control on the multiple-truck vehicle for preventing an over-extended period of time of release of the brake cylinder pressure.

4,999,780

AUTOMATIC RECONFIGURATION OF ELECTRONIC LANDING DISPLAY

James E. Mitchell, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Mar. 3, 1989, Ser. No. 319,383

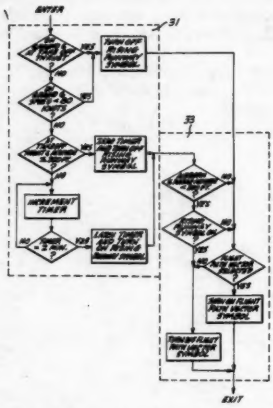
Int. Cl.[5] G06F *15/48, 15/50;* G01C *21/00, 23/00*

U.S. Cl. 364—428 **9 Claims**

1. In an electronic flight instrument system that includes: (i) an electronic landing display that includes a flight path vector (FPV) symbol and a runway symbol that merge toward one another when an aircraft incorporating the electronic flight instrument system descends below a first predetermined altitude above a runway during a landing maneuver; and (ii) a programmable controller for controlling the position and orientation of said FPV and runway symbols of said electronic landing display, the improvement comprising:

means for automatically reconfiguring the electronic landing display by removing said FPV symbol prior to said merging FPV and runway symbols overlapping and occluding one another by programming said programmable controller to remove said FPV symbol from said display when the altitude of said aircraft above said runway drops

below a second predetermined value, said second predetermined value being chosen such that said FPV and



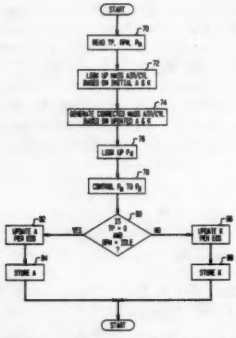
runway symbols do not overlap when the altitude of said aircraft above said runway drops below said second predetermined value.

4,999,781

CLOSED LOOP MASS AIRFLOW DETERMINATION VIA THROTTLE POSITION

William H. Holl, Flint, and Wei-Ming Wang, Fenton, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 17, 1989, Ser. No. 380,435
Int. Cl.[5] G06F *15/20*
U.S. Cl. 364—431.05 **7 Claims**



1. A method of determining mass air flow in an engine having a throttle position sensor for sensing the effective throttle opening and an exhaust oxygen sensor means for indicating deviations from stoichiometry when operating in a closed loop fuel control mode, comprising the steps of:

calibrating initial values for closed throttle airflow offset and a gain factor for part throttle operation,

operating the engine at closed throttle in closed loop fuel control mode with mass airflow determined on the basis of the airflow offset, and updating the offset in response to the oxygen sensor output to obtain stoichiometric operation, and

operating the engine at part throttle in closed loop fuel control mode with mass airflow determined on the basis of the airflow offset plus the gain factor multiplied by the effective throttle opening, and updating the gain factor in response to the oxygen sensor output to obtain stoichiometric operation,

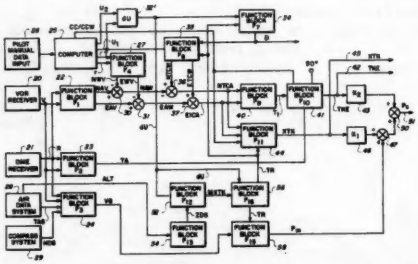
whereby the offset and the gain are continually updated for accurate mass airflow determination over a wide range of operating conditions to obtain stoichiometric engine operation.

4,999,782

FIXED CURVED PATH WAYPOINT TRANSITION FOR AIRCRAFT

Erik T. BeVan, Glendale, Ariz., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 3, 1989, Ser. No. 347,108
Int. Cl.[5] G05D *1/08*; B64C *13/16*
U.S. Cl. 364—448 **24 Claims**



24. An area navigation system for transitioning an aircraft along a track from an inbound course to an outbound course of a area navigation waypoint, said waypoint surrounded by a protected airspace width within which the travel of inbound and outbound air traffic is constrained to fly, said apparatus comprising;

a. means for generating an altitude signal representative of the altitude of said aircraft,

b. means for generating a velocity signal representative of said aircraft ground speed,

c. means for generating a course change signal representative of a course angle change between said inbound and outbound courses,

d. means utilizing said altitude signal for generating a zone designation signal representative of an enroute or terminal zone of said aircraft,

e. means combining said course change signal and said zone designation signal for generating a maximum cross track error signal representative of a maximum distance that an aircraft will deviate from an inbound course or outbound course,

f. means combining said course change signal and said maximum cross track error signal for generating a turn radius signal representative of the radius required for said aircraft to fly a fixed curved path along said track within said protected airspace width,

g. means combining said course change signal and said turn radius signal for generating a distance signal representative of the distance from said waypoint to a point of tangency of said fixed curved path on said inbound course,

h. means combining said turn radius signal and said velocity signal for generating a bank angle bias command signal representative of the bank angle of said aircraft flying along said fixed curved path.

4,999,783

LOCATION DETECTING METHOD

Kenji Tenmoku; Osamu Shimizu; Toshiyuki Shimizu, and Kunihiko Mito, all of Osaka, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

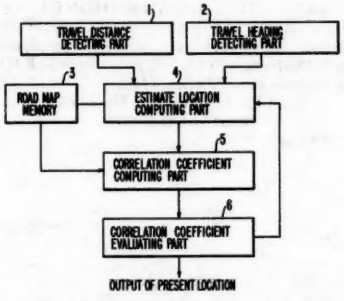
PCT No. PCT/JP88/00452, § 371 Date Dec. 22, 1988, § 102(e) Date Dec. 22, 1988, PCT Pub. No. WO88/08961, PCT Pub. Date Nov. 17, 1988

PCT Filed May 10, 1988, Ser. No. 295,206

Claims priority, application Japan, May 11, 1987, 62-113985

Int. Cl.[5] G06F *15/50*

U.S. Cl. 364—450 16 Claims



1. A location detecting method for detecting the location of a vehicle within a predetermined area, comprising the steps of:

outputting distance data at a predetermined interval, the distance data being representative of the distance that said vehicle has traveled;

outputting heading angle data at a predetermined interval, the heading angle data being representative of the heading angle change of the vehicle travel;

storing road map data representative of roads;

computing a present location data from said distance data and said heading angle data; computing a first limit error (E1) and a second limit error (E2) of said present location data which are determined on the basis of errors in said distance data, in said heading angle data and in said road map data;

registering locations of all roads located within said first limit error (E1), as estimate locations;

computing a correlation coefficient for each of said registered estimate locations to each of said roads located within said first limit error, by accumulating a function having as a parameter the errors between the estimate locations to the registered roads and a location on said road map at a particular point;

selecting one of said correlation coefficients indicating the error with respect to one of said roads is smallest of the errors indicated by said correlation coefficients;

outputting as a present location one of said estimate locations corresponding to the selected one correlation coefficient; and

if any of said roads location within said first limit error (E1) do not exist, outputting as a present location said present location data computed from said distance data and said heading angle data and also registering locations on all said roads located within said second limit error (E2) as second estimate locations, and if a second one of said correlation coefficients indicating that error with respect to each said road of the registered second estimate locations is less than a predetermined value and is smallest of the errors indicated by said correlation coefficients, is obtained, then outputting as a present location one of said second estimate locations corresponding to said second correlation coefficient.

4,999,784

AXIS CHANGEOVER APPARATUS

Hideaki Kawamura, Hachioji, and Kentaro Fujibayashi, Musashino, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

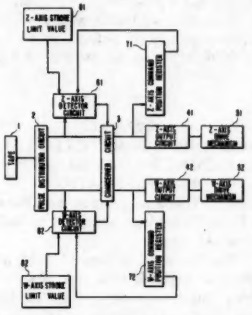
PCT No. PCT/JP88/00818, § 371 Date Feb. 16, 1989, § 102(e) Date Feb. 16, 1989, PCT Pub. No. WO89/01388, PCT Pub. Date Feb. 23, 1989

PCT Filed Aug. 18, 1988, Ser. No. 315,687

Claims priority, application Japan, Aug. 19, 1987, 62-205841

Int. Cl.[5] G05B *23/02*

U.S. Cl. 364—474.01 4 Claims



1. An axis changeover apparatus for changing over axes to be program driven on a machine tool having a drive mechanism for driving a plurality of axes in the same direction based on a commanded value, comprising:

control means for controlling movement of a large stroke axis having a large allowable stroke and a small stroke axis, parallel to the large stroke axis, having a small allowable stroke;

detection means for determining if the commanded value exceeds the small allowable stroke; and

conversion means for converting a portion of the commanded value in excess of the small allowable stroke into a changeover command value along the large stroke axis having the large allowable stroke.

4,999,785

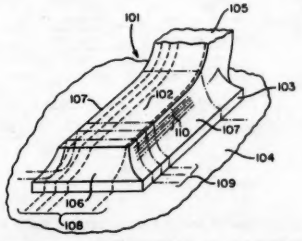
METHOD AND APPARATUS FOR EVALUATING DEFECTS OF AN OBJECT

Samson L. Schmuter, New York, N.Y., assignor to Robotic Vision Systems, Inc., Hauppauge, N.Y.

Filed Jan. 12, 1989, Ser. No. 296,481

Int. Cl.[5] G06F *15/46*

U.S. Cl. 364—507 22 Claims



1. A method of evaluating an object to determine the existence of defects in the object, the method comprising:

processing data related to the object including: developing an indication for each of a first group of said defects, said first group of defects relating to the shape of said object

and said indication for each of said first group of defects relating to a measure of the severity of the defect, said developing an indication including partitioning the data per cross-sectional slices of the object, combining corresponding attributes of said cross-sectional slices and developing therefrom said indication for said first group of defects; developing a composite indication for a remaining composite group of said defects, said composite group of defects relating to the surface of said object and said composite indication relating to a measure of the severity of the composite group of defects, said developing a composite indication including comparing attributes of said cross-sectional slices and developing therefrom said composite indication; and determining whether said composite indication exceeds a predetermined level;

and further processing said data with respect to defects in said composite group of defects when said composite indication is determined to exceed said predetermined level.

4,999,786

METHOD AND APPARATUS FOR MAKING INFERENCES USING FRAME-BASED KNOWLEDGE REPRESENTATION

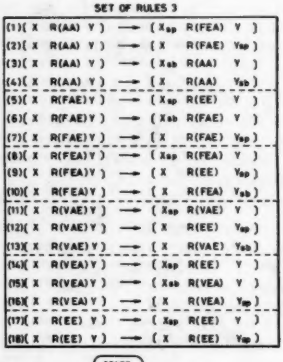
Hiroyuki Mizutani, Yokohama, Japan, and Takashi Moriyasu, Edinburgh, United Kingdom, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

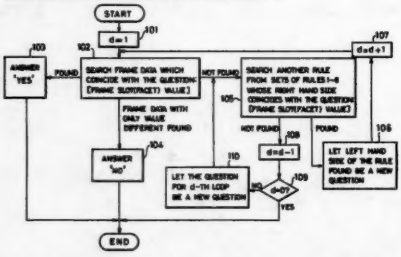
Continuation of Ser. No. 243,858, Sep. 13, 1988, abandoned. This application Aug. 14, 1990, Ser. No. 567,707

Claims priority, application Japan, Sep. 16, 1987, 62-231911

Int. Cl.[5] G06F *15/18*

U.S. Cl. 364—513 **11 Claims**


SET OF RULES 3
(1)(X R(AA) Y) ⟶ (Xsp R(FEA) Y)
(2)(X R(AA) Y) ⟶ (X R(FAE) Ysp)
(3)(X R(AA) Y) ⟶ (Xsb R(AA) Y)
(4)(X R(AA) Y) ⟶ (X R(AA) Ysb)
(5)(X R(FAE) Y) ⟶ (Xsp R(EE) Y)
(6)(X R(FAE) Y) ⟶ (Xsb R(FAE) Y)
(7)(X R(FAE) Y) ⟶ (X R(FAE) Ysp)
(8)(X R(FEA) Y) ⟶ (Xsp R(FEA) Y)
(9)(X R(FEA) Y) ⟶ (X R(EE) Ysp)
(10)(X R(FEA) Y) ⟶ (X R(FEA) Ysb)
(11)(X R(VAE) Y) ⟶ (Xsp R(VAE) Y)
(12)(X R(VAE) Y) ⟶ (X R(EE) Ysp)
(13)(X R(VAE) Y) ⟶ (X R(VAE) Ysb)
(14)(X R(VEA) Y) ⟶ (Xsp R(EE) Y)
(15)(X R(VEA) Y) ⟶ (Xsb R(VEA) Y)
(16)(X R(VEA) Y) ⟶ (X R(VEA) Ysp)
(17)(X R(EE) Y) ⟶ (Xsp R(EE) Y)
(18)(X R(EE) Y) ⟶ (X R(EE) Ysp)



1. An apparatus for making an inference using frame-based knowledge representation, comprising:

knowledge base means including frames comprised of slots and slot values for storing knowledge about objects of interest, each object of said objects being represented by a frame, each categorized character of said each object being represented by a slot in said frame, a particular character value corresponding to said each object being represented by a slot value in said frame, and each slot being accompanied by information regarding a quantitative correspondence between its slot value and the frame to which it belongs; and

inference means for deducing an answer to a question by utilizing frames and slots of said knowledge base means interactively, in which quantitative correspondences among frames and slot values given by said information accompanying slots are utilized to determine possible referencing relationships between each frame and slot.

4,999,787

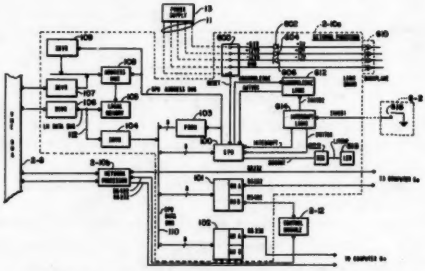
HOT EXTRACTION AND INSERTION OF LOGIC BOARDS IN AN ON-LINE COMMUNICATION SYSTEM

Lance McNally, Townsend; Peter Morley, Pepperell, and James W. Lotti, Marlboro, all of Mass., assignors to Bull HN Information Systems Inc., Billerica, Mass.

Filed Jul. 15, 1988, Ser. No. 219,958

Int. Cl.[5] G06K *15/00*

U.S. Cl. 364—514 **5 Claims**



1. A method of replacing a logic board plugged into a backplane connector in an on-line system without powering down, including the steps of:

A—inserting an end of an umbilical cord into a connector of said logic board to provide auxiliary logic power and a reset signal to disable the logic of said logic board;

B—actuating a hot insert switch to generate a first signal;

C—receiving said first signal by a first computer and sending a hot insert message to a second computer;

D—sending a message by said second computer to said first computer to shut down all activity;

E—sending a message by said first computer to said second computer that all activity is stopped, said first computer setting an indicator to a first state;

F—starting a timer in said second computer;

G—removing said logic board from said backplane connector;

H—removing said umbilical cord end from said logic board and inserting it into a connector of a replacement logic board;

I—inserting said replacement logic board into said backplane connector;

J—removing said umbilical cord end from said connector of said replacement logic board;

K—said first computer awaiting said first signal generated by a second actuation of said hot insert switch indicating that said replacement logic board has been inserted into said backplane connector and said second computer awaiting a signal indicating a timeout;

L—responding by said first computer of said second occurrence of said first signal or a message from said second computer indicating a timeout to restart all activity and setting said indicator to a second state.

3. Apparatus for removing a logic board in an on-line system without powering down comprising:

a power supply for providing a first plurality of voltages and a second plurality of voltages with a reset signal,

a backplane coupled to said power supply for receiving said first plurality of voltages, said backplane including a plurality of connectors,

a plurality of logic boards each coupled to said backplane by one of said plurality of connectors for receiving said first plurality of voltages, one of said plurality of logic boards requiring replacement,

an umbilical cord coupled to said power supply and a first connector on said one of said plurality of logic boards for providing said second plurality of voltages with said reset signal,

said one of said plurality of logic boards including logic means responsive to said reset signal and said second plurality of voltages for remaining in a passive state when unplugged from said one of said plurality of connectors.

4,999,788

ELECTRONIC EQUIPMENT FOR CREATING AND DISPLAYING A DOCUMENT REPRESENTATIVE OF ANOTHER DOCUMENT

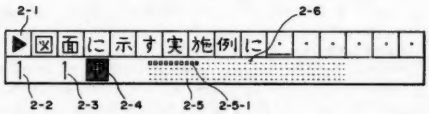
Shinichi Kimura, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 96,243, Sep. 8, 1987, abandoned, which is a continuation of Ser. No. 701,764, Feb. 14, 1985, abandoned. This application Aug. 4, 1989, Ser. No. 393,117

Claims priority, application Japan, Feb. 18, 1984, 59-29430

Int. Cl.[5] G06F *3/12, 15/20;* B41J *3/46*

U.S. Cl. 364—518 **9 Claims**



1. Electronic equipment comprising:

input means for inputting characters at a position designated by a cursor;

position information input means for inputting position information about the column position alignment of input characters at a position designated by a cursor;

memory means having a first memory section for storing the characters inputted through said input means, and a second memory section for storing the position information inputted through said position information input means; and

display means having a first display section for displaying a portion of the characters stored in said first memory section and a second display section for displaying a graphic representation of characters and displaying the position information input through said position information input means, wherein said portion displayed by said first display section and said graphic representation displayed by said second display section are updated and displayed in response to each input of a character by said input means so that the updated portion and graphic representation respectively include the character input at said each input.

4,999,789

METHOD AND APPARATUS FOR TRIMMING B-SPLINE DESCRIPTIONS OF PATCHES IN A HIGH PERFORMANCE THREE DIMENSIONAL GRAPHICS SYSTEM

James G. Fiasconaro, Loveland, Colo., assignor to Hewlett-Packard Co., Palo Alto, Calif.

Filed Feb. 5, 1987, Ser. No. 11,667

Int. Cl.[5] G06F *15/62*

U.S. Cl. 364—518 **3 Claims**

1. In a graphic display system, a method of trimming a polygonal region in a two dimensional (J,K) space, the method comprising the steps of:

a. selecting in a two dimensional (J,K) space an ordered collection of original vertices describing an untrimmed polygonal region in the (J,K) space;

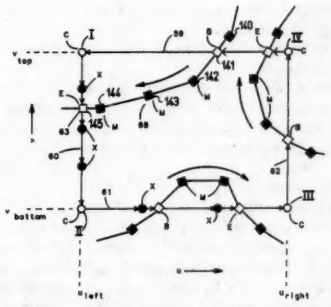
b. selecting two points P1 and P2 along a trimming curve in (J,K) space, P1 and P2 representing a directed line segment P1P2 that is a portion of the trimming curve;

c. setting a first flag to a first value when the directed line segment P1P2 is at least partially within the untrimmed polygonal region and to a second value when the directed line segment P1P2 is wholly outside and separated from the untrimmed polygonal region;

d. setting a second flag to a third value when P1 is outside the untrimmed polygonal region and the directed line segment P1P2 crosses into the untrimmed polygonal region, and to a fourth value when P1 and the directed line segment P1P2 are otherwise;

e. subsequent to setting the second flag to the third value in step (d), replacing the existing value of P1 with an adjusted value equal to that of the point where the directed line segment P1P2 crosses into the untrimmed polygonal region;

f. setting a third flag to a fifth value when the directed line segment P1P2 crosses out of the untrimmed polygonal region and P2 is outside the untrimmed polygonal region,



and to a sixth value when the directed line segment P1P2 and P2 are otherwise;

g. subsequent to setting the third flag to the fifth value in step (f), replacing the existing value of P2 with an adjusted value equal to that of the point where the directed line segment P1P2 crosses out of the untrimmed polygonal region;

h. collecting, in the order in which they occur, an initial adjusted value for P1, any subsequent intervening value of P2 for which the first value for the first flag is associated, followed by a final adjusted value for P2, into an ordered list of points in (J,K) space along the trimming curve and which belong to the untrimmed polygonal region;

i. combining the ordered collection of original vertices selected in step (a) with the ordered list collected in step (h) into a linked data structure of points in (J,K) space, the links in the data structure allowing the points to be visited in a sequence corresponding to the order in which adjacent vertices of a trimmed polygonal region in (J,K) space are encountered during a traversal of the trimming curve and any remaining untrimmed boundaries between the original untrimmed vertices;

j. traversing the linked data structure to produce a sequence of adjacent vertices for a trimmed polygonal region in the two dimensional (J,K) space; and

k. displaying a visual image upon the graphics display system in accordance with the trimmed polygon region.

4,999,790

INFORMATION FILING APPARATUS

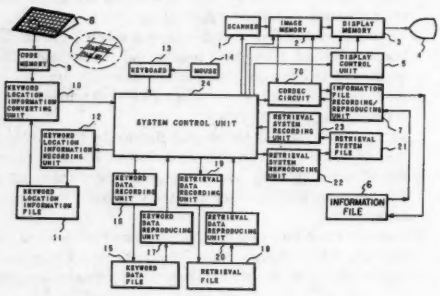
Takashi Murayama, Gifu, and Nobuaki Nii, Ogaki, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Aug. 16, 1988, Ser. No. 232,925

Claims priority, application Japan, Aug. 19, 1987, 62-125818[U]

Int. Cl.[5] G06F *15/40*

U.S. Cl. 364—521 23 Claims



1. An information filing apparatus comprising:

an image information storage means for storing a plurality of image information;

a keyword data storage means for storing data of a plurality of keywords;

a retrieval information storage means for storing storage location information of said image information stored in said image information storage means in correspondence to the data of keywords stored in said keyword data storage means;

a display means;

a first keyword input means including a multiple item input equipment having a plurality of keys generating code data by operation thereof and corresponding to at most all of the keywords whose data are stored in said keyword data storage means, a keyword location information storage means for storing information of the location of the keys on said multiple item input equipment in correspondence to data from said keyword data storage means, and a keyword location information converting unit for converting the code data supplied from said multiple item input equipment into keyword data according to the content of said keyword location information storage means, said first keyword input means enabling input of the keywords in correspondence to operation of the keys, said first keyword input means being operative independent of said display means for enabling said input of the keywords;

a second keyword input means including a keyword list display means for displaying on said display means a keyword list of the keywords whose data are stored in said keyword data storage means so as to enable inputting of the keyword when one of keywords is selected from the keyword list;

an image information retrieval means for retrieving the image information from said image information storage means based on the keyword inputted from said first or second keyword input means and the information stored in said retrieval information storage means; and

an image information output means which reads out the image information retrieved by said image information retrieval means from said image information storage means to display said image information on said display means.

4,999,791

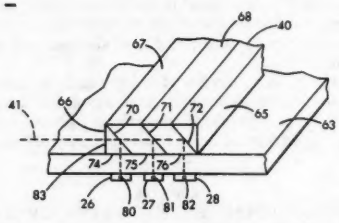
COMPUTER GRAPHICS COLOR FILM RECORDING METHOD AND APPARATUS

Robert W. Schumann, 3038 Irvington Way, Madison, Wis. 53713

Filed Dec. 23, 1988, Ser. No. 291,439

Int. Cl.[5] H04N *1/46, 1/23;* H01J *29/32*

U.S. Cl. 364—525 28 Claims



1. Graphics color film recording apparatus comprising:

(a) film carrier means for supporting a frame of photographic film;

(b) means for emitting light in at least two parallel spaced strips, each strip emitting in a different color, the light being emitted from each strip in discrete pixels, wherein the means for emitting light includes a cathode ray tube and at least three strips of phosphor formed on the face of the cathode ray tube, each strip of phosphor emitting a separate primary color when impinged by the electron beam of the cathode ray tube;

(c) means for focusing the light emitted from the means for emitting light onto a film frame supported by the film carrier means;

(d) means for selectively providing relative movement between the film carrier means, the means for emitting light and the means for focusing the light to selectively change the relative position at which the light emitted from the means for emitting light is focused on the frame of film held by the film carrier means; and

(e) control means for controlling the relative movement between the film carrier means and the means for emitting light and the focusing means, and for controlling the means for emitting light to control the pattern of light emitted in the pixels in each of the strips in correspondence with the position on the film frame at which the light emitted from the strips is focused, wherein the control means includes a buffer memory for storing data words corresponding to a plurality of adjacent columns of pixels to be exposed on the film frame, the number of columns stored equal at least to the number of columns separating the columns of pixels to be exposed on the photographic film at any one position of the film, the data word for each pixel stored at each memory address including data for pixel intensity in each of the three primary colors.

4,999,792

METHOD AND APPARATUS FOR AUTOMATIC FUEL CHANGEOVER

Gregory W. Anderson, Savage; William R. Landis, Bloomington; Paul B. Patton, Rockford, all of Minn.; Paul A. Schimbke, Shorewood, and Michael J. Seidel, Wauwatosa, both of Wis., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 27, 1989, Ser. No. 303,421

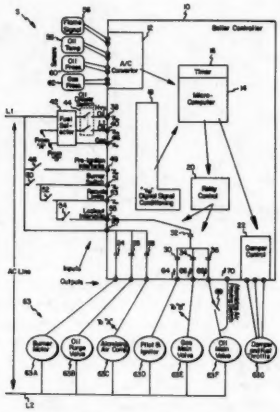
Int. Cl.[5] F23N *5/00*

U.S. Cl. 364—550 28 Claims

1. A method for changing fuels used in a heating system without substantially recycling the heating system where a main flame burns fuel supplied to the heating system, the method comprising:

receiving a fuel changeover signal from a fuel selector;

regulating flow of a first fuel to the heating system, in response to the fuel changeover signal, to achieve a low fire state in a heating system;
establishing a pilot flame in the heating system;
shutting off the flow of the first fuel;
automatically receiving a fuel indicator signal from the fuel selector indicating a desired fuel within an indication time period;



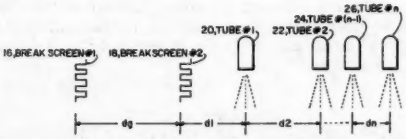
extinguishing the main flame in the heating system burning the first fuel without performing a complete purge of the first fuel from the heating system;
monitoring the pilot flame for stability; and
automatically re-establishing the main flame in the heating system burning the desired fuel in response to the fuel indicator signal.

4,999,793

MICROCOMPUTER REAL-TIME FLASH X-RAY CONTROLLER FOR DATA ACQUISITION

Philip M. Vincent, Hyde Park; Albert L. Chang, Lexington, both of Mass., and Ivan A. Martorell, Delmont, Pa., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 13, 1989, Ser. No. 322,596
Int. Cl.[5] G04F *1/00*; G06M *3/02*
U.S. Cl. 364—569 **9 Claims**



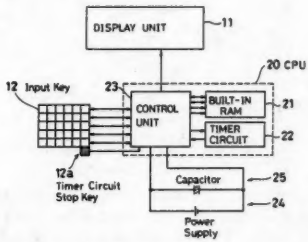
1. A method of performing high speed precision control of action stations used to collect data to assist in the study/analysis of fast moving objects, comprising the steps of:
a. setting up at least two spaced reference points on an axis along which a fast moving object is to be propelled;
b. setting up at least two spaced action stations along said axis at points spaced randomly therealong and downstream of said reference points;
c. moving an object along said axis;
d. measuring the time the moving object takes to move from the first reference point to the second reference point and storing this time in memory;
e. calculating the time it takes the moving object to move from the second reference point to the first spaced action station according to the measured time and geometric setup;
f. initiating a delay procedure to wait for the object to arrive at the first action station and providing an electrical triggering signal to the first action station to initiate an action step in connection with the object moving by the first action station;
g. calculating the time it will take the moving object to move from the first action station to the second action station according to the measured time and the new geometric setup;
h. initiating a delay procedure to wait for the object to arrive at the second action station and providing an electrical triggering signal to the second action station to initiate an action step in connection with the object moving by the second action station; and
i. repeating step g through step h for each additional action station.

4,999,794

ELECTRONIC DEVICE FOR REDUCING THE POWER CONSUMPTION DURING THE SUPPLY OF BACK UP POWER

Akira Yakushiji, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 14, 1989, Ser. No. 323,383
Claims priority, application Japan, Mar. 14, 1988, 63-34109
Int. Cl.[5] G06F *1/00*
U.S. Cl. 364—707 **11 Claims**



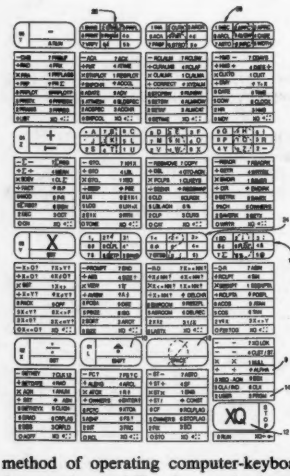
1. An electronic device comprising:
input means for inputting data and display information;
storage means for storing said data information in a readable form;
display means for displaying said display information;
clock means for measuring a time;
main power source supplying means for supplying said storage means and said clock means with electric power;
backup power source supplying means for supplying a substitute power source to only said storage means when said electric power from said main power source supplying means to said storage means and said clock means is cut off;
change-over means for selectively switching between said main power source supplying means and said backup power source supplying means;
control means, connected to one side of said main power source supplying means selected by said change-over means, for controlling said clock means and said storage means in response to said data inputted from said input means;
stop indicating means for indicating a stop of operation of said clock means; and
clock stopping means for stopping said clock means in response to said stop indicating means, thereby the time for backing up said storage means when said change-over means selects said backup power source supplying means is extended.

4,999,795

PORTABLE KEYBOARD OPERATED ALPHA COMPUTER SYSTEM WITH FEW KEYS AND VISUAL KEYSTROKE INSTRUCTIONS

James M. Lapeyre, New Orleans, La., assignor to The Laitram Corporation, New Orleans, La.

Continuation of Ser. No. 158,653, Feb. 22, 1988, Pat. No. 4,860,234, which is a continuation-in-part of Ser. No. 729,559, May 2, 1985, abandoned, and a continuation-in-part of Ser. No. 844,872, Mar. 27, 1986, abandoned, each is a continuation-in-part of Ser. No. 459,998, Jan. 21, 1983, Pat. No. 4,547,860. This application Mar. 29, 1989, Ser. No. 330,988
The portion of the term of this patent subsequent to Aug. 22, 2006, has been disclaimed.
Int. Cl.[5] G06F *3/023*
U.S. Cl. 364—709.16 29 Claims



1. The method of operating computer-keyboard systems having alphanumeric capability from a keyboard having a plurality of manually operated keys coupled on-line with the computer for entering numeric digits, alphabetic characters and computer instructions, including computer instructions for processing numeric digits and computer control functions in a numeric mode and for processing alpha data and computer control functions in the computer in an alpha mode, comprising the steps of:

operationally separating said plurality of keys into at least two different groupings with different corresponding functional operations, one said grouping comprising one subset of keys for input of numeric digits, and another said grouping comprising an alpha input subset of significantly fewer than n of said keyboard keys for entering a full set of n alphabetic characters into the computer,

establishing a control mode in the computer for processing two-stroke digital signals generated from the keyboard keys to effect predetermined control functions,

establishing in response to a keyboard entry of one of said computer instructions said alpha mode to enable the alpha input subset of said keys to enter for processing by said computer the n alphabetic characters responsive to at least two successive keystrokes from keys in said alpha input subset of keys, and

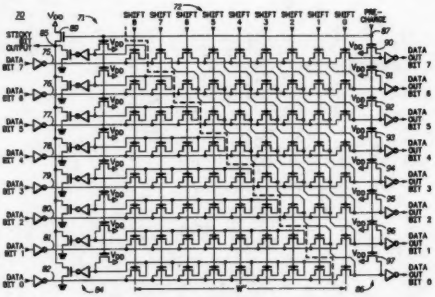
processing in the computer said digital signals representing the alphabetic characters entered by said alpha input subset of keys and further digital signals representing numeric digits and computer instructions entered from the keyboard keys in the numeric mode of computer operation.

4,999,796

STICKY BIT DETECTION AND SHIFTING LOGIC

Bernard C. DeWitt, and Ying-wai Ho, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 14, 1989, Ser. No. 450,796
Int. Cl.[5] G06F *7/00, 15/00*
U.S. Cl. 364—715.08 7 Claims



1. A sticky bit detection and shifting circuit comprising:

a plurality of data input terminals for receiving an input operand having a first predetermined number of bits;

a plurality of control terminals, each of which receives one of a plurality of control signals, each control signal defining a shift number within a predetermined range of bit positions of the input operand to be shifted;

first means coupled to both the plurality of data input terminals and the plurality of control terminals, said first means providing an output detect signal indicating detecting an existence of any bit having a predetermined logic value within the bit positions of the input operand which are shifted; and

second means coupled to the first means, to the plurality of data input terminals and the plurality of control terminals, for providing a shifted output data operand derived from the input operand by selectively shifting a bit or bits off of the input operand in response to the received control signal, said output detect signal being provided within a time period required to provide the shifted output data operand,

the first and second means further comprising a plurality of transistors forming X rows and Y columns, where X and Y are integers, X being equal to the first predetermined number of bits and Y being equal to all shift values within the predetermined range of bit positions, each transistor within each of said X rows having a current electrode connected together and coupled to a predetermined data input terminal and having a control electrode coupled to a predetermined one of the control terminals.

4,999,797

METHOD OF AND DEVICE FOR CIRCLE GENERATION

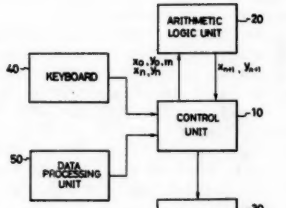
Nobuhito Matsushiro, and Ikuo Oyake, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 277,968
Claims priority, application Japan, Dec. 7, 1987, 62-307691
Int. Cl.[5] G06F *1/02*
U.S. Cl. 364—720 13 Claims

1. A circle-generation device comprising:

a control unit for determining a pair of starting coordinates (x_0, y_0) where x_0 and y_0 are binary numbers and a positive value ϵ of the form $2^{-(m+1)}$ where m is a positive integer; and

an arithmetic-logic unit for receiving said starting coordinates (x_0, y_0) and the positive value ϵ, from said control unit, iteratively performing a matrix computation



$$[x_{n+1}\ y_{n+1}] = [x_n\ y_n]\begin{bmatrix} 1-2\epsilon^2 & -2\epsilon+a\epsilon^3 \\ 2\epsilon-a\epsilon^3 & 1-2\epsilon^2 \end{bmatrix},$$

where is any nonnegative integer and a is equal to 0, 1 or 2, and returning the resultant sequence of coordinates (x_{n+1}, y_{n+1}) to said control unit;

wherein said arithmetic-logic unit comprises:

shift registers,

an x_n input means for receiving and storing in the shift registers an x-coordinate x_n in binary digital form,

a y_n input means for receiving and storing in the shift registers a y-coordinate y_n in binary digital form,

a right bit-shifting means for performing right bit-shift operations on the x-coordinate x_n and the y-coordinate y_n in the shift registers, so as to obtain the values $2\epsilon x_n$, $2\epsilon y_n$, $2\epsilon^2 x_n$, and $2\epsilon^2 y_n$, $a\epsilon^3 x_n$ and $a\epsilon^3 x_n$, and

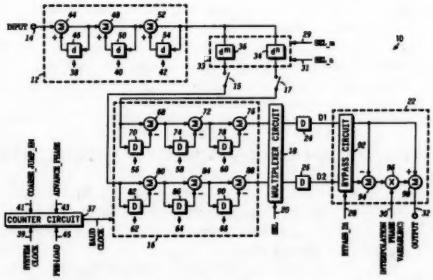
addition and subtraction means for performing addition and subtraction operations on the values obtained from the operations performed by said right bit-shifting means so as to obtain the coordinates $x_n(1-2\epsilon^2)+y_n(2\epsilon-a\epsilon^3)=x_{n+1}$ and $y_n(1-2\epsilon^2)-x_n(-2\epsilon+a\epsilon^3)=y_{n+1}$, and means for sending these coordinates to said x_n and y_n input means to begin the next iteration.

4,999,798

TRANSIENT FREE INTERPOLATING DECIMATOR

Shawn R. McCaslin, Cedar Creek, and Nicholas R. van Bavel, Austin, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 1, 1990, Ser. No. 486,694
Int. Cl.[5] G06F *15/31*
U.S. Cl. 364—724.1 **6 Claims**



1. A transient-error free interpolating decimator utilizing only two comb filters, comprising:

integrator means for receiving a digital input signal at a first clock;

counter means responsive to a first plurality of control signals and to said first clock for providing a second clock and for providing coarse sampling phase jumps by adding or deleting cycles of said first clock to said second clock;

delay means responsive to a second plurality of control signals and coupled to said integrator means for providing coarse sampling phase jumps by delaying said second clock by a predetermined number of first clock cycles;

differentiator means coupled to said delay means and to said second clock and having first and second comb filters operating at said second clock for providing sample points at first and second outputs respectively;

multiplexor means responsive to a first control signal for swapping said first and second outputs of said differentiator means at first and second outputs of said multiplexer means; and

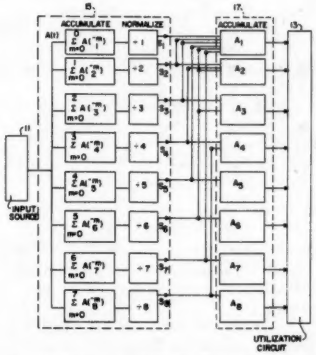
interpolator means responsive to a third plurality of control signals and having first and second inputs coupled to said first and second outputs of said multiplexer means, respectively, for providing fine sampling phase adjustments by interpolation and an output that is transient-error free, said interpolator means includes bypass means coupled to said first and second inputs of said interpolator means for bypassing said first input of said interpolator means.

4,999,799

SIGNAL PROCESSING APPARATUS FOR GENERATING A FOURIER TRANSFORM

Donald W. Tufts, East Greenwich, R.I., assignor to Board of Governors for Higher Education, State of Rhode Island and Providence Plantations, Providence, R.I.

Filed Jan. 9, 1989, Ser. No. 295,122
Int. Cl.[5] G06F *15/332*
U.S. Cl. 364—726 **8 Claims**



1. Signal processing apparatus for converting an input signal representing a function A(t) into a set of output signals respectively representing the values of coefficients of a Fourier series equivalent of said function A(t), said apparatus comprising, in combination,

an input circuit for receiving said input signal,

means for generating plural sets of samples of said input signal within an analysis period of independent variable t of said function A(t),

means for generating an average value of each of said plural sets of said samples of said input signal, and

means for generating said output signals by selectively accumulating selected ones of said average values, said average values being selected in accordance with the Mobius function.

4,999,800

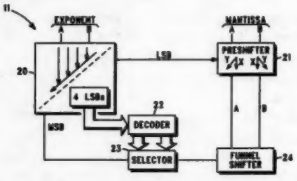
FLOATING POINT ADDER WITH PRE-SHIFTER

Ari Birger, Haifa, Israel, assignor to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 13, 1989, Ser. No. 434,208

Int. Cl.[5] G06F *7/38*

U.S. Cl. 364—748 **5 Claims**



1. A floating point computation device for performing computations on two operands each having an exponent and a mantissa, comprising:

an exponent comparator for comparing the exponents of the two operands to provide an output having a least significant bit and a most significant bit:

a pre-shifter for receiving the mantissa of each of the two operands and being coupled to the exponent comparator for receiving a least significant bit resulting from the comparing of the exponents, the pre-shifter shifting one of the mantissas a predetermined number of bit positions in response to the least significant bit having a predetermined logic value and otherwise not shifting either input operand, the pre-shifter providing the mantissa of the two operands in either shifted or non-shifted form:

a decoder coupled to the exponent comparator for receiving a predetermined number of least significant bits of the output of the exponent comparator, said decoder providing both a difference of the exponents of the two input operands and a two's complement of the difference:

a selector circuit coupled to both the exponent comparator and the decoder for selecting and outputting one of the difference of the exponents or the two's complement thereof as an output signal in response to the most significant bit resulting from the comparing of the exponents: and

a shifter circuit coupled to the pre-shifter for receiving the mantissa of the two input operands in either shifted or non-shifted form, and shifting at least one of the two mantissas by a predetermined number of bits position in response to the output signal of the selector circuit.

4,999,801

FLOATING POINT OPERATION UNIT IN DIVISION AND SQUARE ROOT OPERATIONS

Akira Katsuno, Ebina, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 30, 1989, Ser. No. 374,299

Claims priority, application Japan, Jul. 15, 1988, 63-174872; Aug. 15, 1988, 63-201891

Int. Cl.[5] G06F *7/38*

U.S. Cl. 364—748 **4 Claims**

1. A floating point operation unit comprising an exponent operation means for operating on exponents from two inputs to be processed, a sign operation means for operating on signs from the two inputs, and a mantissa operation means for operating on the respective mantissas of the two inputs, the mantissa operation means comprising:

fixed point multiplication means for receiving at least the respective mantissas of the two inputs and multiplying one of the mantissas by the other of the mantissas and producing a corresponding multiplied output and further producing a corresponding carry output in accordance with an overflow result of each such multiplication;

first right shift means for receiving the multiplication output of the fixed point multiplication means and producing a normalized output, said first right shift means further receiving and being responsive to a carry output of said fixed point multiplication means for shifting the received multiplication output by one bit position for thereby producing the normalized output;

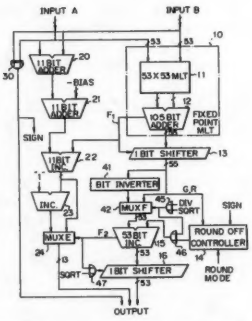
inverter means for receiving the normalized output of said first right shift means and producing a corresponding, inverted output;

rounding off control means for receiving the normalized output of said first right shift means and producing a rounding off control signal output;

means for supplying an iterative approximation control signal for each executed iterative approximation step of a division or square root processing operation;

incrementer means;

means for selectively supplying the inverted output of said inverter means to said incrementing means in response to the iterative approximation control signal and for supplying the normalized output of said first right shift means to said incrementer means in the absence of said iterative approximation control signal;



said incrementer means being responsive to receipt of the rounding off control signal for incrementing the normalized output of said first right shift means, when selectively supplied thereto, and producing a corresponding incremented output, being responsive to receipt of the iterative approximation control signal for incrementing the inverted output of said inverter means, when selectively supplied thereto, and producing a corresponding incremented output, and being responsive to an overflow therein for producing an incrementer carry output; and

second right shift means for receiving said corresponding incremented outputs and, in response to either said incrementer carry output or the iterative approximation control signal corresponding to a square root operation, for shifting the received, corresponding incremented output and thereby producing a normalized mantissa output as the output of said mantissa operation means.

4,999,802

FLOATING POINT ARITHMETIC TWO CYCLE DATA FLOW

Daniel Cocanougher, Fort Worth; Robert K. Montoye; Myhong Nguyenphu, both of Austin, and Stephen L. Runyon, Pflugerville, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 13, 1989, Ser. No. 297,781

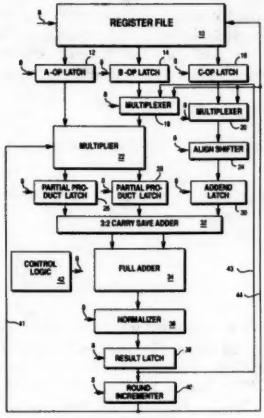
Int. Cl.[5] G06F *7/38*

U.S. Cl. 364—748 **8 Claims**

1. An apparatus for performing floating point arithmetic operations, said apparatus comprising:

means for performing a first floating point arithmetic operation on a set of operands in a first cycle;

means for performing a second floating point arithmetic operation on an operand and a result of said first floating point arithmetic operation in a second cycle;



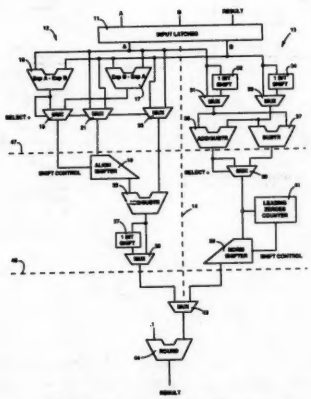
control and rounding means for providing, during a third cycle, a result of the second floating point operation to the first floating point performing means for a first floating point operation in a next successive cycle while rounding the result of the second floating point operation.

4,999,803

FLOATING POINT ARITHMETIC SYSTEM AND METHOD

Silvio Turrini, Trieste, Italy; Judson S. Leonard, Waban, Mass., and Norman P. Jouppi, Palo Alto, Calif., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jun. 29, 1989, Ser. No. 374,164
Int. Cl.[5] G06F *7/38*
U.S. Cl. 364—748 **4 Claims**



1. In a system for performing floating point arithmetic with first and second numbers each having a mantissa and an exponent:

a. means for comparing the exponents of the two numbers;

b. a first data path having an alignment shifter for shifting the mantissa of one of the numbers by more than one place to provide numbers with aligned mantissas and equal exponents, an adder/subtractor for combining the aligned mantissas, and means for normalizing the output from the adder/subtractor by shifting its mantissa by no more than one place;

c. a second data path having means for shifting the mantissa of one of the two numbers no more than one place to provide numbers with aligned mantissas and equal exponents, a pair of subtractors in parallel paths for simultaneously subtracting the mantissa of the first number from the mantissa of the second number and the mantissa of the second number from the mantissa of the first number to produce one result which is positive and one result which is negative, means for selecting the positive result, and means for normalizing the selected result by shifting its mantissa by more than one place; and

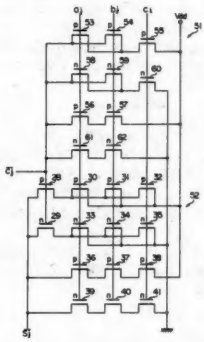
d. means for selecting between the normalized results from the two data paths.

4,999,804

FULL ADDER WITH SHORT SIGNAL PROPAGATION PATH

Tomoji Nukiyama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Mar. 7, 1989, Ser. No. 319,789
Claims priority, application Japan, Mar. 8, 1988, 63-55441
Int. Cl.[5] G06F *7/50*
U.S. Cl. 364—784 **2 Claims**



1. A full adder having first and second input nodes, a low order carry node, and carry node and a sum node, comprising:

(a) a carry producing circuit responsive to at least first and second input bits at said first and second input nodes and a low order carry bit at said low order carry node and producing a carry bit at said carry node; and

(b) a sum producing circuit responsive to said two input bits, said low order carry bit and said carry bit and producing a sum bit at said sum node, in which said sum producing circuit comprises first, second and third field effect transistors of a first channel conductivity type coupled in parallel between a first voltage terminal and a first intermediate node, a fourth field effect transistor of the first channel conductivity type coupled between the first intermediate node and said sum node, fifth, sixth and seventh field effect transistors of a second channel conductivity type coupled in parallel between a second voltage terminal and a second intermediate node, an eighth field effect transistor of the second channel conductivity type coupled between the second intermediate node and the sum node, ninth, tenth, and eleventh field effect transistors of the first channel conductivity type coupled in series between the first voltage terminal and the sum node, and twelfth, thirteenth and fourteenth field effect transistors of the second channel conductivity type coupled in series between the second voltage terminal and the sum node, said low order carry node being coupled to gate electrodes of

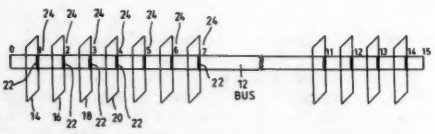
said first, fifth, ninth and twelfth field effect transistors, said first input node being coupled to gate electrodes of said second, sixth, tenth and thirteenth field effect transistors, said second input node being coupled to gate electrodes of said third, seventh, eleventh and fourteenth field effect transistors, said carry node being coupled to gate electrodes of said fourth and eight field effect transistors, and in which said carry producing circuit comprises a fifteenth field effect transistor of said first channel conductivity type coupled between the first voltage terminal and a third intermediate node, sixteenth and seventeenth field effect transistors of the first channel conductivity type coupled in parallel between the third intermediate node and said carry node, an eighteenth field effect transistor of said second channel conductivity type coupled between said second voltage terminal and a fourth intermediate node, nineteenth and twentieth field effect transistors of the second channel conductivity type coupled in parallel between the fourth intermediate node and the carry node, twenty-first and twenty-second field effect transistors of the first channel conductivity type coupled in series between the first voltage terminal and the carry node, and twenty-third and twenty-fourth field effect transistors of the second channel conductivity type coupled in series between the second voltage terminal and the carry node, said low order carry node, being coupled to gate electrodes [to] of said fifteenth and eighteenth field effect transistors, said first input node being coupled to gate electrodes of said sixteenth, nineteenth, twenty-first and twenty-third field effect transistors, said second input node being coupled to gate electrodes of said seventeenth, twentieth, twenty-second and twenty-fourth field effect transistors.

4,999,805

EXTENDED INPUT/OUTPUT CIRCUIT BOARD ADDRESSING SYSTEM

Paul R. Culley, Cypress, and Montgomery McGraw, Spring, both of Tex., assignors to Compaa Computer Corporation, Houston, Tex.

Filed Sep. 9, 1988, Ser. No. 242,728
Int. Cl.[5] G06F *12/00*
U.S. Cl. 364—900 **13 Claims**



1. A system for addressing circuit boards interchangeably insertable into a plurality of slot locations within a computer system, the computer system having a system board including addressable devices and providing n bits of common circuit board addressing lines for input/output spaces, the addressing system being compatible with circuit boards utilizing a previous addressing system of interpreting no more than a lower m bits of the n addressing lines, with a given state of an upper p bits of the lower m bits indicating response by system board addressable devices and the other states of the p bits indicating response by a circuit board addressable device, where p is less than m which is less than n, the circuit boards further being responsive to a line for disabling the interpretation of addressing lines, the addressing system comprising:

means for determining the state of the upper p bits of the lower m bits of the n addressing lines;

means for determining the state of r bits of the n addressing lines where the r bits are higher than the lower m bits, wherein the r bits may indicate a slot location or the system board;

means for rendering the system board responsive to a line for disabling the interpretation of addressing lines and having an effective slot location; and

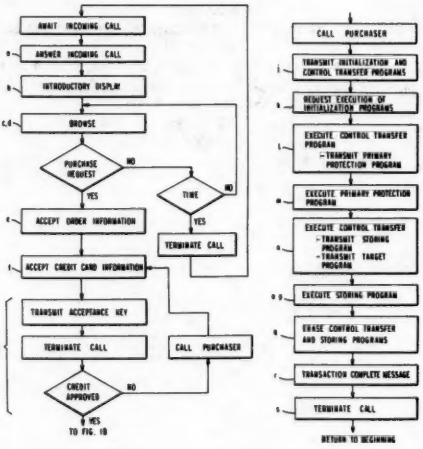
means responsive to said p bits state determining means and said r bits state determining means for providing a disabling signal to the disabling line of a circuit board or the system board when the p bits are in the state previously indicating response by system board addressable devices and the r bits indicate other than the slot location of the circuit board or the system board.

4,999,806

SOFTWARE DISTRIBUTION SYSTEM

Fred Chernow, 360 Kiowa Pl., Boulder, Colo. 80303, and Randy J. Peterson, 1330 Arapahoe St., Boulder, Colo. 80302

Filed Sep. 4, 1987, Ser. No. 93,321
Int. Cl.[5] G06F *12/14;* H04L *9/00*
U.S. Cl. 364—900 **52 Claims**



1. A method of transferring software from a central station to requester equipment in communication with said central station over a communications link for storage at said requester equipment, said method comprising the steps of receiving a request for a particular program, transmitting said particular program to said requester equipment and interrupting said communications link, said method further comprising the steps of:

transmitting executable program material to said requester equipment in response to communication from said re-

quester equipment to said central station and in addition to said particular program; and

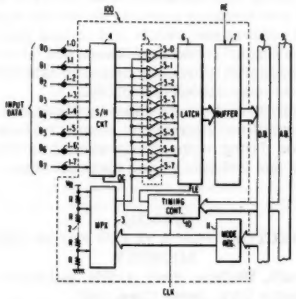
executing at least a portion of said additional program material at said requester equipment prior to interruption of said communications link to prevent unauthorized use of said particular program.

4,999,807

DATA INPUT CIRCUIT HAVING LATCH CIRCUIT

Mineo Akashi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jan. 25, 1988, Ser. No. 148,309
Claims priority, application Japan, Jan. 25, 1987, 62-14944
Int. Cl.[5] G06F *3/00, 13/00*
U.S. Cl. 364—900 **9 Claims**



1. An input circuit comprising a set of input terminals supplied with input data consisting of a plurality of bits, means for generating a reference voltage, a comparator circuit comparing a level of each bit of said input data with said reference voltage, dividing means for dividing a clock signal to generate a latch-enable pulse in a predetermined cycle, a latch circuit latching data derived from said comparator circuit in response to said latch-enable pulse, a set of output terminals coupled to a utilization circuit, means responsive to a read signal from said utilization circuit for transferring data latched in said latch circuit to said set of output terminals when said read signal takes an active level, and means coupled to said dividing means for inhibiting said dividing means from dividing said clock signal during said active level of said read signal, whereby said latch-enable pulse is not generated during said active level of said read signal.

4,999,808

DUAL BYTE ORDER DATA PROCESSOR

Donald E. Blahut, Holmdel; Brian W. Colbry, Frenchtown, both of N.J.; Thomas D. Lovett, Portland, Oreg., and Peter V. LaMaster, Edison, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

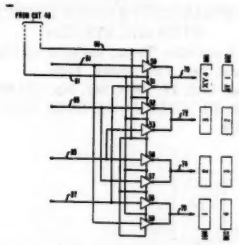
Continuation of Ser. No. 913,545, Sep. 26, 1986, abandoned, which is a continuation-in-part of Ser. No. 433,449, Oct. 8, 1982, abandoned. This application Oct. 5, 1989, Ser. No. 420,631
Int. Cl.[5] G06F *7/24*
U.S. Cl. 364—900 **3 Claims**

1. A combination comprising

(a) a data processor adapted for receiving and processing binary coded words each of which is organized into a plurality N of bytes, N being greater than 2 such bytes containing a multiplicity of bits, the processor designed for responding to and properly utilizing each of such words if and only if each of such words is organized in accordance with a first byte order convention being either a left-to-right or a right-to-left byte order convention but not if such words are organized in accordance with a second byte order convention which is in reverse from the first byte order convention;

(b) memory means for storing binary coded words each of which has a like plurality N of bytes organized in accordance either with convention or with the second byte order convention;

(c) transfer means for moving words from the memory means into the processor in response to signals from the processor;



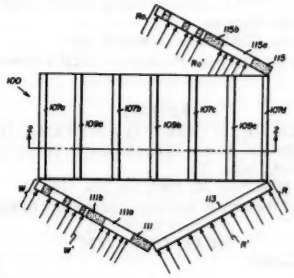
(d) byte order control means for changing in response to a byte-order control signal, from said second to said first byte order convention, simultaneously in a single operation the byte order of all the bytes in each such word being moved from the memory to the processor when the words stored in the memory means are organized in accordance with the second byte order convention.

4,999,809

PHOTOREFRACTIVE DEVICE AND PROCESS FOR ITS USE

Jay S. Schildkraut; Ralph H. Young, both of Rochester; David J. Williams, Fairport, and Michael Scozzafava, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 9, 1990, Ser. No. 491,398
Int. Cl.[5] G11C *13/00*
U.S. Cl. 365—106 **24 Claims**



1. A photorefractive device comprised of

first and second electrical biasing means for establishing a potential gradient between first and second spaced locations and, interposed between said first and second electrical biasing means,

intermediate means capable of producing in a readout beam of electromagnetic radiation an image pattern corresponding to that present in a spatially intersecting writing beam of electromagnetic radiation when a potential gradient is applied to said intermediate means by said first and second electrical biasing means,

characterized in that said intermediate means consists of a photorefractive layer capable of internally storing the image pattern of the writing beam created by its interference with an intersecting reference beam of electromagnetic radiation, said photorefractive layer being comprised of a homogeneous charge neutral organic photoconductor containing organic noncentrosymmetric mo-

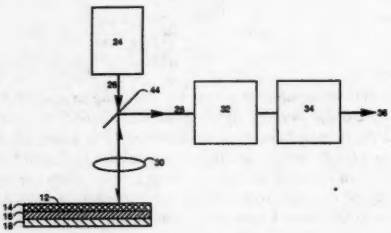
lecular dipoles capable of imparting to said photorefractive layer a second order polarization susceptibility of greater than 10^{-9} esu, said molecular dipoles each containing an electron donor moiety linked through a conjugated π bonding system to an electron acceptor moiety.

4,999,810

SURFACE-ENHANCED RAMAN OPTICAL DATA STORAGE SYSTEM

Tuan Vo-Dinh, Knoxville, Tenn., assignor to Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.

Filed Oct. 19, 1989, Ser. No. 423,995
Int. Cl.[5] G11C *13/04, 13/00, 11/00*
U.S. Cl. 365—124 **19 Claims**



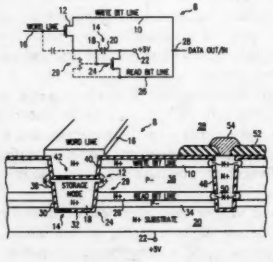
19. A method for the storage and reading of data comprising:
providing a SERS medium which has a microenvironment that will emit a SERS signal when excited;
producing a data signal corresponding to the data to be stored;
disturbing the microenvironment of the SERS medium with the data signal corresponding to the data thereby changing the ability of the surface to emit a SERS signal in the disturbed regions, whereby such disturbed regions constitute stored data;
exciting the surface of the SERS medium with a laser and causing a SERS emission signal corresponding to the stored data thereon;
detecting the SERS emission signal; and
producing the data from the detected SERS emission signal.

4,999,811

TRENCH DRAM CELL WITH DYNAMIC GAIN

Sanjay K. Banerjee, Austin, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 30, 1987, Ser. No. 126,523
The portion of the term of this patent subsequent to Sep. 5, 2006, has been disclaimed.
Int. Cl.[5] G11C *11/24*
U.S. Cl. 365—149 **10 Claims**



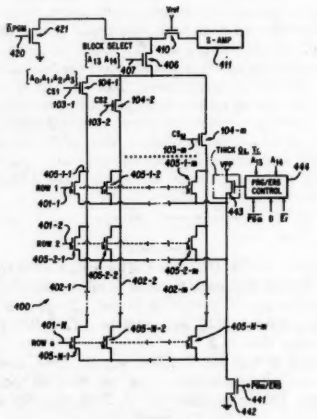
1. A semiconductor dynamic random access (DRAM) cell, comprising:
a layered semiconductor formed on a substrate having a number of layers, the layered semiconductor having a trench formed therein, with sidewalls of the trench cut through the layers and with a bottom of the trench in the substrate;
a dielectric formed along the sidewalls and bottom in said trench;
a storage node material contacting the dielectric within the trench, the storage node material together with the dielectric and the substrate defining a storage capacitor;
a vertical gain transistor including source and drain regions formed adjacent said trench, said storage node being a gate electrode and said dielectric defining a gate insulator of said vertical gain transistor;
a terminal for connecting a voltage supply to the substrate and the drain region of said vertical gain transistor;
the source region of said vertical gain transistor defining a portion of a bit line for providing a path for an output signal during read operations of said DRAM cell;
a vertical pass transistor including source and drain regions formed adjacent said trench, said vertical pass transistor having a channel connected between said bit line and said storage node for providing charge to said DRAM cell during write operations thereof; and
a gate electrode of the vertical pass transistor for connecting with a word line operative to control said vertical pass transistor during write operations and to control said vertical gain transistor during read operations.

4,999,812

ARCHITECTURE FOR A FLASH ERASE EEPROM MEMORY

Alaaeldin Amin, Dhahran, Saudi Arabia, assignor to National Semiconductor Corp., Santa Clara, Calif.

Filed Nov. 23, 1988, Ser. No. 275,380
Int. Cl.[5] G11C *7/00, 11/40*
U.S. Cl. 365—185 **21 Claims**



1. A memory device comprising:
a memory cell comprising:
a source region;
a drain region located apart from said source region;
a channel region located between said source and said drain regions;
a floating gate electrode above and insulated from said channel region sufficiently close to said source region to allow charge transfer between said floating gate electrode and that portion of said channel region adjacent said source region, and sufficiently distant from said drain region to prevent charge transfer between said floating gate electrode and that portion of said channel region adjacent said drain region; and

a control gate electrode located above said channel region and said floating gate electrode and insulated from said channel region and said floating gate electrode;

programming means connected to said source region for selectively causing a change in the charge stored on said floating gate electrode, thereby altering the control gate threshold voltage of said memory cell; and

reading means connected to said drain region for determining the amount of current flow through said channel region in response to the application of a set of read voltages to said control gate electrode, source region, and drain region.

4,999,813

NONVOLATILE SEMICONDUCTOR MEMORY HAVING A STRESS TEST CIRCUIT

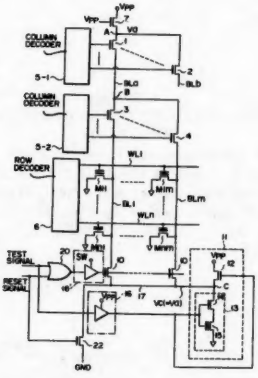
Nobuaki Ohtsuka; Junichi Miyamoto, both of Yokohama, and Shigeru Atsumi, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation-in-part of Ser. No. 261,863, Oct. 25, 1988, abandoned. This application Apr. 20, 1989, Ser. No. 341,287

Claims priority, application Japan, Oct. 28, 1987, 62-272119

Int. Cl.[5] G11C *29/00, 16/04*

U.S. Cl. 365—201 **12 Claims**



1. A nonvolatile semiconductor memory comprising:

a plurality of bit lines each having a first end an a second end;

a plurality of word lines;

nonvolatile semiconductor memory cells arranged in a matrix form and respectively connected to corresponding ones of said bit lines and word lines;

means for selecting one of said bit lines and one of said word lines;

a first transistor coupled to the first end of each of said bit lines, said first transistor being turned on in a data programming mode of the semiconductor memory;

a plurality of second transistors respectively connected between the second ends of the bit lines and a common connecting line, said first transistor being turned off and said second transistors being turned on in a test mode of the semiconductor memory, each of said second transistors having a mutual conductance smaller than that of said first transistor; and

means connected to said common connecting line for applying a stress voltage to said bit lines in the test mode.

4,999,814

DYNAMIC MEMORY WITH INTERNAL REFRESH CIRCUIT AND HAVING VIRTUALLY REFRESH-FREE CAPABILITY

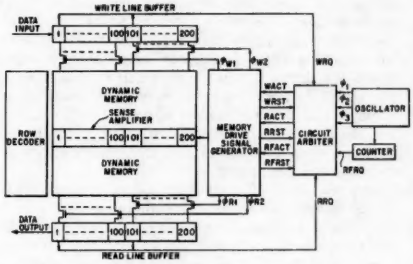
Masashi Hashimoto, Ami, Japan, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 7, 1987, Ser. No. 83,555

Claims priority, application Japan, Aug. 13, 1986, 61-189992

Int. Cl.[5] G11C *7/00*

U.S. Cl. 365—222 **8 Claims**



1. A semiconductor memory device comprising:

dynamic memory array means including a plurality of dynamic memory cells arranged in a matrix of rows and columns and having an input and an output;

write line buffer memory means having first and second write line buffer memories disposed at the input of said dynamic memory array means for serial-parallel conversion of write data as input therefrom into the dynamic memory cells of said dynamic memory array means;

read line buffer memory means having first and second read line buffer memories disposed at the output of said dynamic memory array means for parallel-serial conversion of read data as output from the dynamic memory cells of said dynamic memory array means;

sense amplifier means having first and second sense amplifier sections operably connected to said dynamic memory array means and connected in parallel to said write line buffer memory means and said read line buffer memory means respectively, each of said first and second sense amplifier sections including a plurality of sense amplifiers corresponding in number to the dynamic memory cells defining a respective one-half row of dynamic memory cells of said dynamic memory array means;

said first sense amplifier section being respectively connected in parallel to said first write line buffer memory and said first read line buffer memory and to one-half row of dynamic memory cells of said dynamic memory array means;

said second sense amplifier section being respectively connected in parallel to said second write line buffer memory and said second read line buffer memory and to the remaining one-half row of dynamic memory cells of said dynamic memory array means;

control circuit means connected to said dynamic memory array means, said write line buffer memory means, said read line buffer memory means, and said sense amplifier means for regulating data transfer so that said first and second write line buffer memories and said first and second read line buffer memories are respectively operable in tandem with said first and second sense amplifier sections respectively in inputting data to and outputting data from said dynamic memory array means;

said control circuit means including an internal write/read signal generator means operably connected to said dynamic memory array means, said write line buffer memory means, said read line buffer memory means, and said sense amplifier means for generating respective write request

signals and read request signals to which said write line buffer memory means and said read line buffer memory means are individually responsive in performing data transfer with said dynamic memory array means;

internal refresh circuit means for generating a refresh request signal to enable a refresh signal to be periodically applied to said dynamic memory cells of said dynamic memory array means;

internal arbiter circuit means operatively connected to said write/read signal generator means and to said refresh circuit means for determining relative priority between said write, read, and refresh request signals;

said first write line buffer memory and said second write line buffer memory alternately receiving serial input data and transferring input data to one-half row of dynamic memory cells of said dynamic memory array means in response to a write request signal, one of said first and second write line buffer memories receiving serial input data, while the other of said first and second write line buffer memories has the capability of writing data into one-half row of dynamic memory cells of said dynamic memory array means at the same time;

said first read line buffer memory and said second read line buffer memory alternately accepting read data from one-half row of dynamic memory cells of said dynamic memory array means and providing a serial read data output, one of said first and second read line buffer memories receiving read data from one-half row of said dynamic memory cells of said dynamic memory array means, while the other of said first and second read line buffer memories has the capability of providing a serial read data output corresponding to the remaining one-half row of said dynamic memory cells of said dynamic memory array means at the same time; and

the storage capacities of said first and second write line buffer memories and said first and second read line buffer memories being sufficiently large to enable the memory device to perform a read data output continuously without interruption upon the condition that read data is present in one of said first and second read line buffer memories at a time when a read request signal in the operational cycle is available to be acted upon by said first and second read line buffer memories, whereby a substantially refresh-free serial data access memory is provided.

4,999,815

LOW POWER ADDRESSING SYSTEMS

John E. Barth, Jr., South Burlington; Charles E. Drake, Underhill, both of Vt.; William P. Hovis, Rochester, Minn.; Howard L. Kalter, Colchester, Vt.; Gordon A. Kelley, Jr., Essex Junction, Vt.; Scott C. Lewis, Essex Junction, Vt.; Daniel J. Nickel, Westford, Vt., and James A. Yankosky, Essex Junction, Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 13, 1990, Ser. No. 479,137
Int. Cl.[5] G11C *11/40*
U.S. Cl. 365—230.06 **13 Claims**

1. A memory system comprising

a given number of memory segments, each having word and bit/sense lines,

a first plurality of decode means coupled to said given number of memory segments for selecting one word line in each of said memory segments,

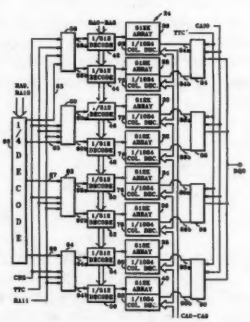
a first plurality of transmission gate systems, each having first and second transmission gates, with each of said gates being coupled to an input to a different one of said decode means,

a second decode means having a first plurality of outputs, each of said outputs being coupled to a respective one of said transmission gate systems,

first means for selectively activating said first and second gates in each of said first plurality of transmission gate systems,

a third plurality of decode means coupled to said given number of memory segments for selecting one bit/sense line in each of said memory segments,

a second plurality of transmission gate systems, each having first and second transmission gates, with each of said gates of said second plurality of transmission gate systems being



coupled to a different one of said third plurality of decode means, and

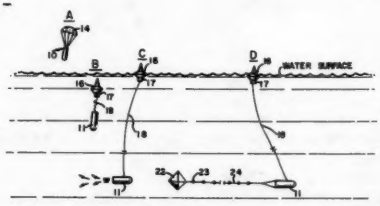
means for selectively activating said first and second transmission gates of each of said second plurality of transmission gate systems.

4,999,816

HYDROPHONE DEPLOYMENT SYSTEM FOR A SONOBUOY

John R. Dale, Pennsburg, and Roger A. Holler, Warminster, both of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 1, 1983, Ser. No. 528,506
Int. Cl.[5] H04B *1/59*; B63B *21/52*
U.S. Cl. 367—4 **19 Claims**



1. A hydrophone deployment system for an air-launched sonobuoy comprising, in combination:

tow means including a metal hydride motor for providing a jet thrust in water;

flotation means within said tow means and ejectable therefrom upon immersion in the water;

cable means connected at one end to said flotation means and formed within said tow means to payout as said tow means descends to a selected depth in the water;

hydrophone array means operatively connected to the other end of said cable means and formed within said tow means to payout as said tow means moves relative to said cable means at the selected depth; and

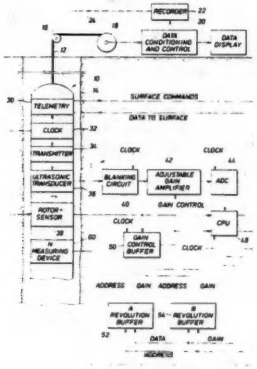
control means connected to said tow means and responsive to a deployment event for initiating the thrust at the selected depth.

4,999,817

PROGRAMMABLE GAIN CONTROL FOR ROTATING TRANSDUCER ULTRASONIC TOOLS

Mark D. Zimmer, Katy, Tex., assignor to Halliburton Logging Services Inc., Houston, Tex.

Filed Feb. 22, 1990, Ser. No. 483,486
Int. Cl.[5] G01V *1/40*
U.S. Cl. 367—65 15 Claims



1. A method of ultrasonic scanning formations along a well borehole comprising the steps of:

(a) rotating an ultrasonic transducer to direct transmitted pulses therefrom along azimuthal directions to encompass an azimuthal sector in segments;

(b) receiving an echo for a selected interval at the transducer after the transmittd pulse;

(c) amplifying the received transducer signal through a gain controlled amplifier and;

(d) providing a gain control signal to the gain controlled amplifier during a first revolution of said ultrasonic transducer wherein that revolution is divided into a set of intervals and forming a digital word representing the gain control value for particular intervals, and storing said first revolution gain control values in digital form, retrieving these values for corresponding intervals of the next following revolution, and applying the retrieved values to said gain control amplifier.

4,999,818

ULTRASONIC PEST REPELLER

Patrick F. Malleolo, 550 Paularino Ave., L108, Costa Mesa, Calif. 92626

Filed Sep. 18, 1989, Ser. No. 408,280
Int. Cl.[5] H04B *1/02*
U.S. Cl. 367—139 10 Claims

1. An ultrasonic pest repeller comprising,

transducer means for producing ultrasonic pressure waves,

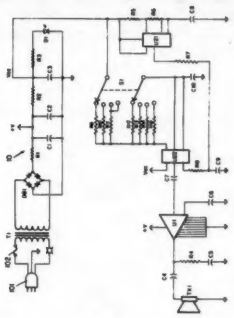
audio amplifier means connected to drive said transducer means,

oscillator means connected to drive said audio amplifier means,

said oscillator means includes at least first and second multivibrator means,

said oscillator means including a variable resistance network for adjusting the frequency of said oscillator means,

said variable resistance network is connected to only one of said first and second multivibrator means, and



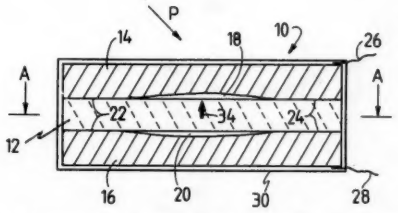
coupling means connected from an output of said first multivibrator means to an input of said second multivibrator means.

4,999,819

TRANSFORMED STRESS DIRECTION ACOUSTIC TRANSDUCER

Robert E. Newnham; Qichang C. Xu, both of State College, and Shoko Yoshikawa, Bellefonte, all of Pa., assignors to The Pennsylvania Research Corporation, University Park, Pa.

Filed Apr. 18, 1990, Ser. No. 510,490
Int. Cl.[5] H04R *17/00*
U.S. Cl. 367—157 8 Claims



1. An acoustic transducer assembly comprising: a piezoelectric element having a stress transforming capability which transforms and amplifies an incoming axial compressive stress and converts it to a radial extensional stress in piezoelectric ceramic; at least a pair of metal means positioned to sandwich said piezoelectric element therebetween, each said metal means having a cavity formed therein, each having a coefficient of thermal expansion and contraction which is larger than said coefficient of thermal expansion and contraction for said piezoelectric ceramic; and bonding means interposed between said metal means and said piezoelectric ceramic for bonding said metal means and said piezoelectric ceramic at an elevated temperature, whereby, upon cooling, said metal means holds said piezoelectric ceramic in compression.

4,999,820

HOUR METER ACTIVATED BY MAGNETIC INFLUENCE

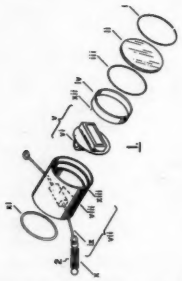
Henry T. Hetzel, 1931 S. County Rd. 19, Loveland, Colo. 80537

Filed Apr. 28, 1989, Ser. No. 344,910
Int. Cl.[5] G04F *8/00*; G04B *47/00*; G01R *33/00*
U.S. Cl. 368—9 9 Claims

1. An hour meter for registering elapsed running time of a work apparatus, the hour meter comprising:

sensing means, responsive to an alternating magnetic field, for inducing directly from stray magnetic flux escaping

from the work apparatus an electrical activity signal that is in a first state in the absence of an alternating magnetic field of at least a certain sufficient magnitude and that is in a second state in the presence of an alternating magnetic field that is of the sufficient magnitude; and



timer means responsive to the electrical activity signal by accumulating the elapsed time during which the electrical activity signal is in the second state and by not accumulating when the electrical activity signal is in the first state.

4,999,821

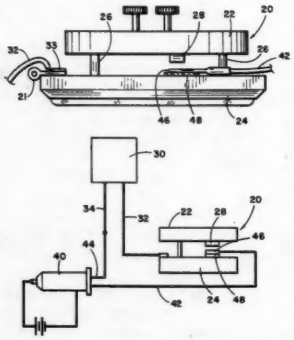
TRUCK DRIVER'S WAKE-UP DEVICE

Ephraim A. Kirkland, Rte. 1, Box 1375, Afton, Okla. 74331

Filed Oct. 30, 1989, Ser. No. 428,781

Int. Cl.[5] G04B *47/00*

U.S. Cl. 368—12 **2 Claims**



1. A truck driver's wake-up device comprising a conventional mechanical alarm clock constructed from metal parts which are electrically conductive and having therein an alarm trip which moves in a predetermined rectilinear path when an internal alarm system in the clock is actuated, a support for mounting the clock thereon, a high output buzzer capable of producing a loud alarm mounted on the support, the buzzer having first and second input leads for actuating the alarm when an input voltage of 8–16 volts DC is imposed across the leads, a standard automotive cigarette lighter adapter having first and second outlet leads for providing approximately 12 volts DC output when the adapter is inserted into a standard cigarette lighter socket, the first output lead from the adapter being grounded to the clock, the second output lead from the adapter being connected to the second input lead to the buzzer, a non-conductive insulator plate connected to the clock adjacent the alarm trip, an electrically conductive spade connector attached to the insulator plate and in the path of movement of the alarm trip but out of electrical contact with the metal parts of the clock mechanism, the first input lead to the buzzer being connected to the spade connector whereby, when the internal alarm system for the clock is actuated, the alarm trip will contact the spade connector to complete the electrical circuit to the buzzer.

4,999,822

DIAL FACE FOR CLOCK OR WATCH

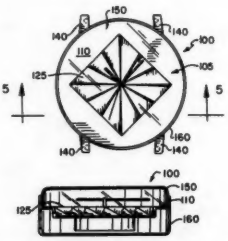
Bruce N. Blackburn, Pelham, N.Y., assignor to Bernard Weinstein, New York, N.Y.

Continuation-in-part of Ser. No. 260,411, Oct. 20, 1988, Pat. No. 4,884,256. This application Nov. 27, 1989, Ser. No. 441,747

The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

Int. Cl.[5] G04B *19/04*

U.S. Cl. 368—228 **24 Claims**



1. An apparatus for indicating time comprising:

(a) a face having a plurality of stationary member positioned at an angle with respect to a horizontal base plane and arranged in a predetermined orientation relative to a central point, each said member comprising a first plane and a second plane which intersect to form a common edge therebetween, said first and second planes being of different areas and terminating in a first plane boundary and a second plane boundary, respectively, wherein the boundary of the first plane of one members contacts a portion of the boundary of the second plane of an adjacent member; and

(b) means for determining elapsed time by viewing said face.

4,999,823

WATCH CASE OVERLAID WITH A CAP GLUED TO THE CASEBAND

Laurent Grosjean, Neuchatel, Switzerland, assignor to ETA S.A. Fabriques d'Ebauches, Grenchen, Switzerland

Filed Jul. 18, 1989, Ser. No. 381,323

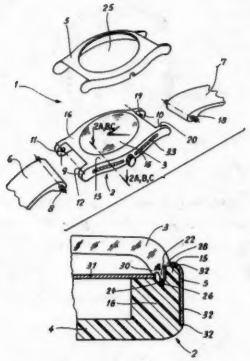
Claims priority, application Switzerland, Jul. 19, 1988, 02762/88

Int. Cl.[5] G04B *37/00*

U.S. Cl. 368—295 **6 Claims**

1. A watch case including a caseband-bezel of plastic material, a crystal secured to the caseband-bezel, a metallic cap completely overlaying the bezel and extending at least partially over the side of he caseband, and a glue serving to secure said cap to said caseband-bezel, the side of the caseband overlaid by the cap having a receptacle provided within the thickness o the caseband and extending at least partially along the periphery of said caseband so as to receive said glue, the side of the caseband overlaid by the cap exhibiting starting from the bezel, a first zone, a second zone providing said receptacle

within the thickness of the caseband and a third zone arranged to be in contact with an internal wall of the cap, said zones



extending at least partially the length of the caseband periphery.

4,999,824

MAGNETO-OPTICAL MEMORY DEVICE

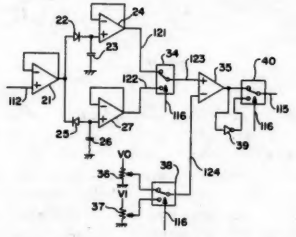
Hiroshi Fuji, Tenri; Shigemi Maeda, Yamatokoriyama; Noriaki Sakamoto, Kyoto; Shigeo Terashima; Takeshi Yamaguchi, both of Tenri; Kentaro Tsuji, and Kunio Kojima, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 12,087, Feb. 6, 1987, Pat. No. 4,924,447. This application Nov. 22, 1989, Ser. No. 440,261

Claims priority, application Japan, Feb. 7, 1986, 61-26636; Feb. 28, 1986, 61-45761; Mar. 28, 1986, 61-73298

Int. Cl.[5] G11B *13/04, 11/10, 11/12*

U.S. Cl. 369—13 **2 Claims**



1. A magneto-optic memory device for recording and erasing information by means of a laser beam with respect to a magneto-optic recording medium which is provided with a pair of recording magnetic films formed on opposite faces thereof and magnetized in a same direction in advance, through a determination of the direction of a biasing magnetic field upon an identification of respective recording faces of said recording medium, said magneto-optic memory device comprising:

a first peak hold circuit for detecting a positive peak level of a playback signal;

a second peak hold circuit for detecting a negative peak level of said playback signal;

a first selecting circuit for selecting either one of the outputs from said first and second peak hold circuits in accordance with a control signal that indicates each of said recording faces of said recording medium;

a second selecting circuit for selecting either one of two reference voltages, wherein said reference voltages are different in voltage level from each other in accordance with said control signal which indicates each of said recording faces of said recording medium; and

a comparison circuit for comparing therein an output selectively sent from said first selecting circuit with said reference voltage selected by said second selecting circuit;

said magneto-optic memory device being capable of detecting a recorded region formed in said magneto-optic recording medium by use of said comparison result; and

synchronization circuit for detecting synchronizing information in a row of data recorded in said magneto-optic recording medium.

4,999,825

RECORDING/READING APPARATUS FOR INSCRIBABLE RECORD CARRIER AND ITS MANUFACTURE

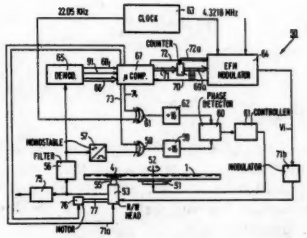
Wilhelmus P. M. Raaymakers, and Franciscus L. J. M. Kuijpers, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 1, 1988, Ser. No. 265,649

Claims priority, application Netherlands, Jan. 22, 1988, 8800152

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—44.26 **17 Claims**



1. An optically readable and inscribable record carrier comprising: a recording layer for recording an information pattern of optically detectable recording marks, the record carrier having a servo track wherein a portion for information recording includes a periodic track modulation different from the information pattern, the periodic track modulation having a modulation frequency indicative of a position-information signal comprising position-code signals alternating with position-synchronization signals.

4,999,826

FOCUSED-SPOT-POSITION DETECTION DEVICE FOR OPTICAL INFORMATION RECORDING AND REPRODUCING DEVICE

Teruo Fujita, Kyoto, Japan, assignor to Mitsubishi Denki K.K., Tokyo, Japan

Continuation of Ser. No. 196,190, Apr. 22, 1988, Pat. No. 4,888,757. This application Dec. 4, 1989, Ser. No. 445,298

Claims priority, application Japan, Aug. 29, 1986, 61-204261

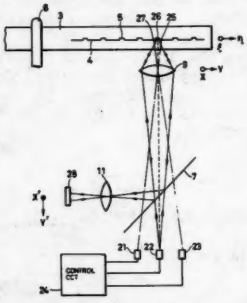
The portion of the term of this patent subsequent to Dec. 19, 2006, has been disclaimed.

Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—44.41 **1 Claim**

1. In a focused-spot-position detecting device for an optical information recording and reproducing device including light source means, focusing means for focusing a light beam from said light source means onto an information recording medium having information tracks, light beam separating means for separating a reflected light beam from said information recording medium from said light beam from said light source means, an optical sensor for converting said reflected light beam into an electric signal and a control signal generator responsive to an output signal of said optical sensor for producing a control

signal for correcting a focus point of said focusing means and correcting a tracking, an improvement characterized by said light source means comprising a plurality of light sources capable of being on-off controlled by a control circuit and arranged such that focus points of light beams of said light sources are juxtaposed vertically with respect to said information tracks on said information recording medium, said optical sensor comprising at least two optical sensor elements each having a light receiving region having a major length in parallel with said information tracks, said optical sensor elements being arranged in a far field from said information recording medium, further comprising an operation circuit for sampling and holding a differential output signal and a sum output signal of said optical sensor elements in synchronism with the on-off energizations of said light sources and operating the sample-hold outputs to obtain a focusing error signal, wherein said



light source means includes three light sources, and wherein said three light sources comprise a first light source between second and third light sources, and wherein said operation circuit obtains said focusing error signal by performing the following expression:

$$\{I_{DF}(-\pi/2)+I_{DF}(0)\}\cdot\{I_{SUM}(-\pi/2)-I_{SUM}(0)\}+\{I_{DF}(0)+I_{DF}(\pi/2)\}\cdot\{I_{SUM}(0)-I_{SUM}(\pi/2)\},$$

where $I_{DF}(0)$ and $I_{SUM}(0)$ are said differential output signal and said sum output signal, respectively, of said optical sensor elements when said first light source is lit, $I_{DF}(\pi/2)$ and $I_{SUM}(\pi/2)$ are said differential output signal and said sum output signal, respectively, when said second light source is lit, and $I_{DF}(-\pi/2)$ and $I_{SUM}(-\pi/2)$ are said differential output signal and said sum output signal, respectively, when said third light source is lit.

4,999,827

RECORDING AND/OR REPRODUCING APPARATUS FOR TAPE TYPE OPTICAL RECORDING MEDIUM

Senri Miyaoka, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 7, 1988, Ser. No. 280,938

Claims priority, application Japan, Dec. 29, 1987, 62-336509

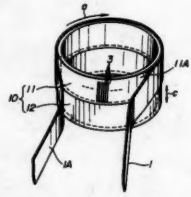
Int. Cl.[5] G11B *7/00*

U.S. Cl. 369—44.18 **16 Claims**

1. A recording and/or reproducing apparatus for a tape type optical recording medium comprising:

scanning means for emitting a scanning beam having recording information onto the recording surface of said recording medium; and

guide means having light-transmitting properties, said guide means comprising a mating surface which mates with said recording surface and has a recording guide track formed therein;



wherein said scanning means controls said scanning beam in such a manner that said scanning beam is focused on and scans along said recording guide track.

4,999,828

RECORD CARRIER DECODER FOR MULTI-TRACK DATA PATTERNS INCLUDING ERROR PROTECTION DATA

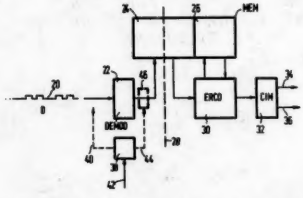
Rudy W. J. Pollen, and Martinus P. M. Bierhoff, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 255,807, Oct. 11, 1988. This application Jan. 6, 1989, Ser. No. 294,313

Claims priority, application Netherlands, Dec. 23, 1987, 8703109

Int. Cl.[5] H04N *5/76*; G11B *5/09*

U.S. Cl. 369—59 **21 Claims**

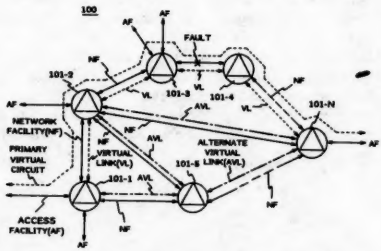


1. A decoding device for a record carrier provided with a multi-track digital data pattern which includes error protection data wherein a data word includes not only user symbols but also redundancy symbols, successive data words being stored from the record carrier in a distributed manner in order to allow for correcting burst errors, there also being provided a detection mechanism for supplying pointer signals for suspect symbols, the decoding device comprising a memory for collecting all symbols of a data word and an error correction element which is fed by the memory in order to perform, if necessary and possible, up to a predetermined maximum number of corrections within a word while using said pointer signals, and to supply an excess signal in the case of an excessive number of errors, and the decoding device comprises a selectively activatable concealment element which is fed by the correction element in order to deactivate, under the control of the excess signal, a received, presumably irrepairable user symbol on a user output, the decoding device being provided a detector for detecting a loss of track signal formed by a read element and for invalidating, in response thereto, a series of symbols supplied by the read element for an input of the memory in order to create an increased number of errors within a data word and to supply, upon reception of a sufficient number of invalid symbols whether measured or artificial, also said excess signal holds for all symbols of the relevant word.

4,999,829
AUTOMATIC FAULT RECOVERY IN A PACKET NETWORK

Franklin D. Fite, Jr., Aberdeen, and Duncan K. Sparrell, Jacobstown, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 6, 1989, Ser. No. 431,795
Int. Cl.[5] H04J 3/14
U.S. Cl. 370—16 **29 Claims**



1. Apparatus in a packet node for recovering from faults in transmission paths including at least one virtual circuit in a network including a plurality of packet nodes, the apparatus comprising:

means for detecting faults in at least one transmission path associated with the node;

first means for determining if any virtual circuit affected by a detected fault is terminated in the node;

second means for determining if any virtual circuit affected by the fault has at least one alternate virtual circuit present in the node;

means for generating fault indication messages for virtual circuits affected by the detected fault that are not terminated in the node and have no alternate virtual circuit present in the node;

first means for transmitting each of said generated fault indication messages on associated virtual circuits to some other node in the network; and

means for switching any affected virtual circuits determined to be terminated in the node or determined to have at least one alternate virtual link present in the node to associated alternate virtual circuits for transmission toward a destination node.

4,999,830
COMMUNICATION SYSTEM ANALOG-TO-DIGITAL CONVERTER USING ECHO INFORMATION TO IMPROVE RESOLUTION

Oscar E. Agazzi, Scotch Plains, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Sep. 25, 1989, Ser. No. 412,257
Int. Cl.[5] H04J 1/00
U.S. Cl. 370—32.1 **10 Claims**

1. A communication system for exchanging digital signals over a transmission link comprising

at least one terminal including

means for supplying an input digital stream to the terminal,

means for forming an analog signal corresponding to the input digital stream and for applying the analog signal to the transmission link,

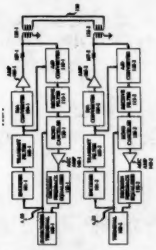
means for concurrently receiving an analog signal from the transmission link, said received analog signal including a predetermined component corresponding to the input digital stream to the terminal, and

means responsive to the received analog signal for forming an output digital stream comprising

means responsive to the input digital stream for generating an m<n bit digital signal corresponding to the predetermined component of the received analog signal,

means for forming an analog signal representative of the difference between the received analog signal and the m<n bit digital signal corresponding to the predetermined component of the received analog signal,

means for converting the difference representative analog signal to an n-m bit digital signal, and

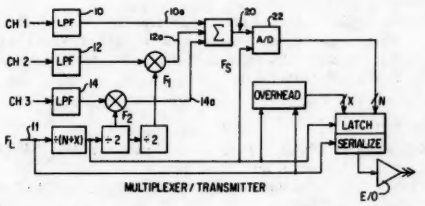


means for combining the predetermined component m bit digital signal with the n-m bit digital signal corresponding to the difference representative signal to produce an n bit digital signal representing the received analog signal.

4,999,831
SYNCHRONOUS QUANTIZED SUBCARRIER MULTIPLEXER FOR DIGITAL TRANSPORT OF VIDEO, VOICE AND DATA

Martin K. Grace, Prairie Village, Kans., assignor to United Telecommunications, Inc., Shawnee Mission, Kans.

Filed Oct. 19, 1989, Ser. No. 423,374
Int. Cl.[5] H04J 4/00, 1/08
U.S. Cl. 370—50 **7 Claims**



1. A method of transmitting at least two information bearing signals over a communication link comprising the steps of

a. mixing a first signal having a bandwidth B_1 with a local carrier signal having a frequency F_1;

b. mixing a second signal having a bandwidth B_2 with a second local carrier signal having a frequency F_2 which is greater than F_1 such that F_2-B_2 exceeds F_1+B_1;

c. multiplexing the carriers to form a composite signal;

d. synchronously sampling the composite signal at a sampling rate F_S where F_S is equal to 2 times F_2 and converting the composite signal to a digital signal representative thereof;

e. applying said digital signal to the communication link;

f. receiving said digital signal at a receiver connected with said link in a manner such that F_S is recoverable at the receiver and converting said digital signal to a reconstructed composite signal substantially identical to the first named composite signal; and

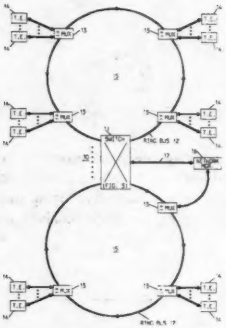
g. recovering the first and second signals from said reconstructed signal.

4,999,832

BROADBAND MULTIRATE SWITCHING ARCHITECTURE

Hung-San Chen, Golden; Scott E. Farleigh, Denver; John S. Helton, Louisville, and Allen L. Larson, Thornton, all of Colo., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Nov. 27, 1989, Ser. No. 441,794
Int. Cl.[5] H04J 3/16
U.S. Cl. 370—85.14 17 Claims



1. A switching system comprising:

a plurality of input ports, each input port for receiving a different frame each comprising an identical sequence of time slots;

a plurality of output ports, each output port for transmitting a frame each comprising a sequence of time slots; and

a plurality of switching means, each switching means connected to all of the input ports and to one of the output ports and each including its own

repeatedly-operating first means for selecting in the received frames a position of a time slot in the sequence, and

repeatedly-operating second means for selecting one of the received frames.

wherein the connected output port transmits individual time slots having the positions selected by the first means in the frames selected by the second means as different time slots of the transmitted frame.

4,999,833

NETWORK CONNECTIVITY CONTROL BY ARTIFICIAL INTELLIGENCE

William C. Lee, Corona Del Mar, Calif., assignor to ITT Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 125,738, Nov. 30, 1987, abandoned, which is a continuation of Ser. No. 731,189, May 6, 1985, abandoned. This application Dec. 20, 1988, Ser. No. 287,742
Int. Cl.[5] H04J 3/24
U.S. Cl. 370—94.1 17 Claims

1. In a communications system of the type including a plurality of individual radio frequency transceivers wherein a communications link can be set up between a first one of said transceivers to any other one of said transceivers via various paths which paths may include other ones of said transceivers which other ones act as relays in said communications link, each of said transceivers capable of receiving and transmitting messages, the improvement in combination therewith comprising:

each of said plurality of transceivers having message transmitting and receiving means for transmitting and receiving messages between transceivers,

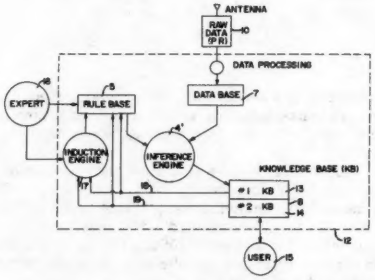
selected ones of said plurality of transceivers each having an artificial intelligence apparatus coupled to its message receiving means for receiving messages which are transmitted from a transmitting transceiver to the selected transceiver or broadcasted within range of the selected transceiver for ultimate transmission to a receiving transceiver through a relaying transceiver which may include the selected transceiver itself,

wherein said artificial intelligence apparatus coupled to selected ones of said transceivers in said system includes:

a microprocessor for processing message data indicative of selected attributes of transmitted messages between transceivers, as received by the selected transceiver, and selected attributes of the communications links in which said messages between transceivers are transmitted,

a data base memory for storing therein said message data indicative of transmitted messages and communications links between said transceivers,

a rule base memory for storing rules for establishing minimum criteria for said selected attributes of transmitted



messages and communications links in order for particular ones of the communications links to be deemed as desired communications links by said artificial intelligence apparatus for radio transmissions between transceivers,

an inference computing means connected to said data base memory and to said rule base memory and operative to scan the message data stored in said data base memory and to match the message data with the rules for establishing minimum criteria in said rule base memory in order to generate output conclusion data indicative of desired communications links,

a knowledge base memory coupled to said inference computing means for storing said output conclusion data indicative of desired communications links, whereby the selected transceiver is enabled to relay transmitted messages on the desired communications links based on the conclusion data stored in its knowledge base memory.

4,999,834

COMMUNICATION METHOD AND APPARATUS

Robert P. Leo, Charlotte; Mark W. McColgan, Concord; James E. Stockman, III, and Jeffrey H. Young, both of Charlotte, all of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 20, 1989, Ser. No. 326,136
Int. Cl.[5] H04J 3/26
U.S. Cl. 370—94.1 8 Claims

1. A method of communicating between a primary station and a secondary station comprising the steps of:

generating a high-speed clock signal at the primary station;

generating at the primary station for transmission to the secondary station a data packet, a sequence number associated with the data packet and a first error checking key based on the sequence number and data packet and assembling the data packet, the sequence number and the first error checking key into an information packet;

transmitting the information packet and the high-speed

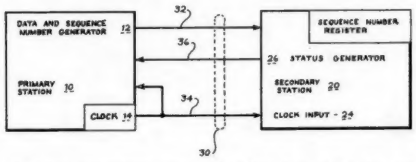
clock signal from the primary station to the secondary station so that the same clock signal is used by the primary and secondary stations for both transmitting and receiving the information packet;

transmitting a packet-termination signal from the primary station to the secondary station to indicate the end of the information packet;

using the high-speed clock from the primary station to control the receiving of the information and control signals at the secondary station;

recognizing at the secondary station the signal indicating the end of a transmission packet;

generating a secondary error checking key for the received information packet by the secondary station and comparing the secondary error checking key with the error checking key received by the secondary station from the primary station with the information packet;



discarding the information if any transmission errors were detected as evidenced by the failure of the keys to match;

comparing the sequence number received with a generated expected sequence number;

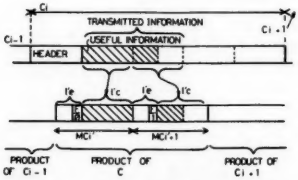
generating status data at the secondary station for transmission in response to the information packet from the primary station, the status data reflecting success or failure in receipt of the information packet from the primary and a status report of the secondary station, but without a sequence number being applied to the communication from the secondary station to the primary station.

4,999,835

METHOD AND DEVICE FOR ASYNCHRONOUS MODE TRANSMISSION PUTTING MICROCELLS INTO USE

Pierre Lagoutte, Issy les Moulineaux, France, assignor to LMT Radio Professionnelle, Boulogne Billancourt, France

Filed Aug. 1, 1989, Ser. No. 388,001
Claims priority, application France, Aug. 5, 1988, 88 10613
Int. Cl.[5] H04J *3/24*
U.S. Cl. 370—94.1 **10 Claims**



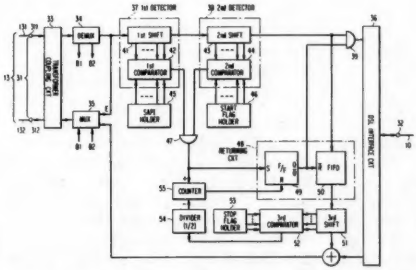
1. A method for the transmission, in an asynchronous mode, for a multiple-service network with a wide range of throughput rates, respectively associated with the different services, of digital data conveyed in cells of a pre-defined length, each cell formed of a header and a data field, wherein, to route, with a suitable transmission efficiency, the communications at low throughput rates and in real time, the method comprises in the performance, at one end of a trunk line or main line, after switching, the steps of converting the transmission cells in to microcells of smaller length having a data field length resulting from a whole number division of the data field length of the cells, and a header of proportionate length, said header having an indicator which indicates the last microcell having a data field with information and, at the other end of the trunk line, before switching, reverse converting to restore the standardized cells to the switch.

4,999,836

ISDN NETWORK TERMINATION UNIT ENABLING TO ESTABLISH DATA LINK BETWEEN ONE TERMINAL EQUIPMENT AND OTHER TERMINAL EQUIPMENTS CONNECTED TO THE UNIT WITHOUT USE OF SUBSCRIBER LINE

Ryuhei Fujiwara, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 7, 1989, Ser. No. 362,778
Claims priority, application Japan, Jun. 7, 1988, 63-138488
Int. Cl.[5] H04J *3/12*; H04Q *11/04*
U.S. Cl. 370—110.1 **6 Claims**



1. A network termination unit for use in an integrated services digital network (ISDN) system, said network termination unit comprising a first port to which a plurality of terminal equipments are connected in parallel with one another, a second port to which a digital subscriber line is connected, a demultiplexer coupled to the first port for demultiplexing a first TDM (Time Division Multiplexed) signal incoming through the first port from one of the terminal equipments to extract a first control channel signal for establishing a data link, the first control channel signal having an identifier code, a digital subscriber line interface circuit coupled to the second port for transmitting the first control channel signal as a second control channel signal in a second TDM signal to the second port, said digital subscriber line interface circuit receiving a third TDM signal incoming through the second port to extract a third control channel signal, and a multiplexer coupled to the first port for multiplexing the third control channel signal as a fourth control channel signal in a fourth TDM signal to deliver the fourth TDM signal to the first port, wherein the improvement comprises:

code holding means for holding a predetermined code;

code deciding means coupled with said demultiplexer and said code holding means for deciding whether or not said identifier code in said first control signal is coincident with said predetermined identifier code, said code deciding means producing a return control signal when said identifier code is coincident with said predetermined code; and

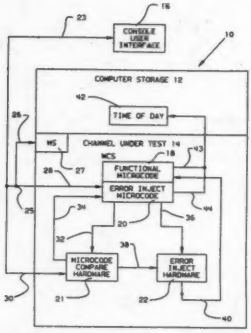
returning means coupled with said code deciding means and responsive to said return control signal for returning said first control channel signal as a return signal to said multiplexer, said multiplexer receiving said return signal as the third control channel signal to thereby return said first control channel signal to said first port as the fourth control channel signal in the fourth TDM signal without delivering the second TDM signal including the first control channel signal to said second port.

4,999,837

PROGRAMMABLE CHANNEL ERROR INJECTION

Frank S. Reynolds, Poughkeepsie, and Louis W. Ricci, Hyde Park, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 20, 1989, Ser. No. 325,417
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—3 **22 Claims**



11. An error injection tool for use in a computer system having working storage for storing control bits, addressable instruction storage for storing microcode instructions, and a microcode controlled device whose function is controlled by the control bits in said working storage, said microcode controlled device having a microcode instruction executing means for executing microcode instructions stored in a set sequence of addresses in said microcode instruction storage, said error injection tool comprising:

address compare means for comparing a selected address with the address of a microcode instruction currently being executed;

interrupt signal generating means for generating an interrupt signal responsive to an equal compare by said address compare means;

a microcode routine for altering said control bits stored in said working storage responsive to said generated interrupt signal for injecting a delayed error, which delayed error is not injected until the use of said altered control bit by the execution of a subsequent microcode instruction at a later time;

execution control means for transferring the execution of said microcode executing means to said microcode routine responsive to said interrupt signal; and

return means in said microcode routine for returning the execution of said microcode executing means to a microcode instruction at the address following said selected address in said set sequence of addresses such that the effect of the altered control bits on the microcode controlled device may be observed.

4,999,838

FAILURE RECOVERY INFORMING ARRANGEMENT WITH SIMPLIFIED HARDWARE IN A DATA PROCESSING SYSTEM

Akinori Horikawa, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

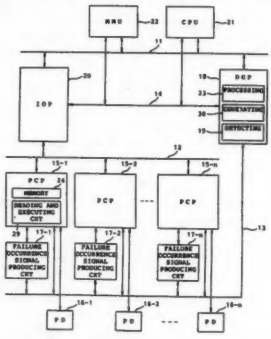
Filed Jul. 20, 1988, Ser. No. 221,553
Claims priority, application Japan, Jul. 21, 1987, 62-180108
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—16.1 **6 Claims**

1. A failure recovery informing arrangement for use in a data processing system comprising a system bus, a diagnostic bus, and a peripheral control processor connected to said diagnostic bus, operable in a normal state of operation, and put into a down state upon occurrence of a failure, said failure recovery informing arrangement comprising:

failure occurrence signal producing means connected to said peripheral control processor and to said diagnostic bus for producing a failure occurrence signal indicative of occurrence of said failure and for delivering said failure occurrence signal to said diagnostic bus;

a diagnostic processor connected to said system bus and to said diagnostic bus for detecting said failure occurrence signal to deliver a detection signal to said system bus upon detection of said failure occurrence signal; and

recovery command signal producing means connected to



said system bus for producing a recovery command signal in response to said detection signal to deliver said recovery command signal back to said system bus,

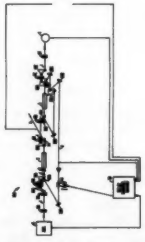
said diagnostic processor further processing said recovery command signal into a peripheral initializing signal and a recovery informing signal to deliver said peripheral initializing signal and said recovery informing signal to said peripheral control processor, said peripheral initializing signal being for turning said down state back to said normal state, said recovery informing signal informing said peripheral control processor that said down state is turned back to said normal state as a result of occurrence of said failure.

4,999,839

AMPLIFIER-OSCILLATOR FREE ELECTRON LASER

David A. G. Deacon, Los Altos, Calif., assignor to Deacon Research, Palo Alto, Calif.

Filed Jul. 3, 1989, Ser. No. 375,430
Int. Cl.[5] H01S *3/00*
U.S. Cl. 372—2 **13 Claims**



1. A laser having as an excitation source a source of charged low-mass particles, said laser comprising:

an optical amplifying means having an input disposed to receive said charged particles from said excitation source, said amplifying means comprising first means for producing a first spatially reciprocating magnetic field along a

first optical section of an optical path of an optical beam and along a first particle section of a particle path of a particle beam where said first optical section and said first particle section overlap; and,

an optical oscillator means disposed to receive said charged particles only through said amplifying means, said oscillator means comprising second means for producing a second spatially reciprocating magnetic field along a second optical section of said optical path and along a second particle section of said particle path where said second optical section and said second particle section overlap, said second spatially reciprocating magnetic field being of sufficient energy and said particle beam being of sufficient current density to produce gain above a threshold sufficient to induce lasing in said optical beam; and

means for redirecting at least a portion of optical energy of said optical beam from said oscillator section to said input of said amplifying means.

4,999,840

STABILIZED SYNCHRONOUSLY PUMPED DYE LASER

Daniel K. Negus, La Honda, Calif., assignor to Coherent, Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 381,205, Jul. 18, 1989. This application Mar. 14, 1990, Ser. No. 493,467

Int. Cl.[5] H01S *3/098*

U.S. Cl. 372—18 **12 Claims**

1. A laser system comprising:

mode locking means for generating a train of pulses;

means for generating a negative group velocity dispersion within a laser resonator cavity to stabilize and lengthen the pulses in said train; and

means for adding positive group velocity dispersion to the pulses in said train outside of the laser resonator cavity to compress said pulses in said train.

4,999,841

SEMICONDUCTOR LASERS

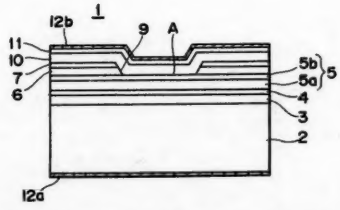
Hajime Sakiyama, Kyoto; Haruo Tanaka, Shiga, and Masato Mushiage, Kyoto, all of Japan, assignors to Rohm Co., Ltd., Kyoto, Japan

Filed Jan. 24, 1990, Ser. No. 469,248

Claims priority, application Japan, Jan. 24, 1989, 1-14345; Jan. 24, 1989, 1-14348

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—45 **2 Claims**



1. A semiconductor laser, wherein a lower portion cladding layer, an active layer, a first upper portion cladding layer, a light absorption layer, an evaporation preventing layer are laminated in order on a semiconductor substrate, a stripe groove which reaches a first upper portion cladding layer from the evaporation preventing layer is formed, a second upper portion cladding layer and a cap layer are laminated so as to cover the stripe groove, electrodes are respectively formed on the semiconductor substrate and the cap layer, and the first upper portion cladding layer is of a double construction of which the upper layer portion is rendered to be higher in carrier concentration than the lower layer portion.

4,999,842

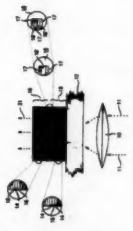
QUANTUM WELL VERTICAL CAVITY LASER

Kai-Feng Huang, Shenchu, China; Jack L. Jewell, Bridgewater, N.J.; Samuel L. McCall, Jr., Gillette, N.J., and Kuochou Tai, North Plainfield, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Mar. 1, 1989, Ser. No. 317,699

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—45 **21 Claims**



1. Apparatus comprising quantum well laser vertical cavity structure for lasing in a direction non-parallel to the major dimensions of a quantum well, such laser consisting essentially of an active element containing one or two quantum wells and a cavity dependent upon reflectance as between two distributed feedback mirrors.

4,999,843

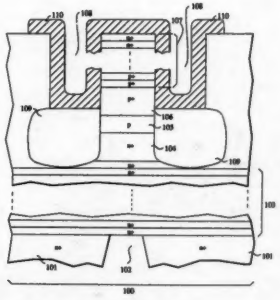
VERTICAL SEMICONDUCTOR LASER WITH LATERAL ELECTRODE CONTACT

Sergey Luryi, Bridgewater, and Ya-Hong Xie, Flemington, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jan. 9, 1990, Ser. No. 462,244

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—45 **9 Claims**



1. In a vertical semiconductor laser

(a) an optically active region located in a semiconductor body;
(b) a top optical cladding layer located on top of the optically active region;
(c) a top mirror located on the top surface of the top cladding layer
(d) a top electrode contacting a peripheral portion of the top cladding layer.

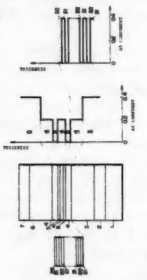
4,999,844

SEMICONDUCTOR QUANTUM WELL LASER

Hiroshi Imamoto, Takatsuki, Japan, assignor to Omron Tateisi Electronics Co., Kyoto, Japan

Filed Apr. 12, 1989, Ser. No. 337,069
Claims priority, application Japan, Apr. 15, 1988, 63-91634
Int. Cl.[5] H01S *3/19*
U.S. Cl. 372—45 **5 Claims**

1. A semiconductor structure for use as a quantum well laser having a resonant cavity, at least one electrode, a substrate layer, a cap layer, a buffer layer and at least one clad layer, comprising at least two active layers and at least three barrier layers enclosing both sides of each said active layer, each said barrier layer being formed by alternately accumulating thin



films respectively having different mixed crystal ratios so as to obtain a superlattice structure possessing an intermediate mixed crystal ratio therebetween.

DESIGN PATENTS

GRANTED MAR. 12, 1991

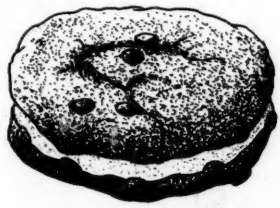
ERRATA

For CLASS	See PATENT NO.
D08-336	315,293
D02-314	315,389
D29-022	315,427

DESIGNS

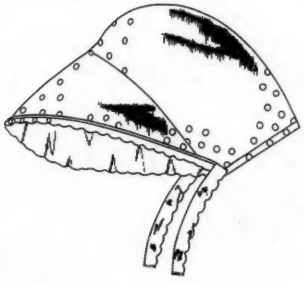
MARCH 12, 1991

315,241
DECORATED LAYERED COOKIE
Patricia Constance, Wyckoff, N.J., assignor to Nabisco Brands, Inc., East Hanover, N.J.
Filed Jun. 14, 1985, Ser. No. 744,549
Term of patent 14 years
U.S. Cl. D1—128



315,242
RESTRAINT VEST
Randal R. Ruge, Swanton, Ohio, assignor to R. R. Ruge, Inc., Toledo, Ohio
Filed Feb. 8, 1989, Ser. No. 307,602
Term of patent 14 years
U.S. Cl. D2—184

315,243
PLASTIC LINED RAIN BONNET
Jeanette Ciabattari, R.D. 3, Harmon Creek, Pa. 15021
Filed Jul. 6, 1987, Ser. No. 69,755
Term of patent 14 years
U.S. Cl. D2—510

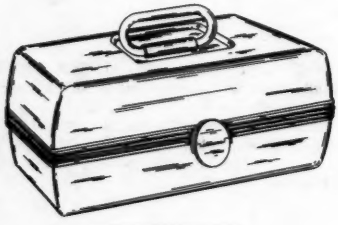


315,244
BOW TIE
Richard Cadot, 187 Gordon Avenue, Verdun, Canada H4G 2R2
Filed Mar. 3, 1988, Ser. No. 175,999
Term of patent 14 years
U.S. Cl. D2—606

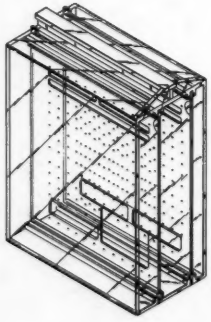
315,245
COMBINED CONTAINER AND CARRIER WRISTBAND
Sune Envall, Västerås, Sweden, assignor to Lillemor Reuterskiöld, Stockholm, Sweden
Filed Mar. 29, 1989, Ser. No. 330,097
Claims priority, application Sweden, Sep. 29, 1988, 88-2209
Term of patent 14 years
U.S. Cl. D3—30.1

315,246
ARTICLE STORAGE CONTAINER
Stephanie H. Drake, 960 Stephens Rd., Maineville, Ohio 45039
Filed Jan. 27, 1988, Ser. No. 148,239
Term of patent 14 years
U.S. Cl. D3—71

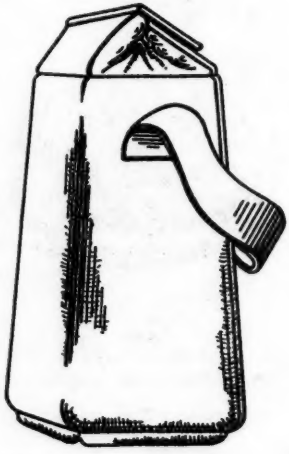
315,247
CARRYING CASE FOR COSMETICS OR THE LIKE
Brian Lovell, San Diego, Calif., assignor to Plano Molding Company, Plano, Ill.
Filed Jun. 28, 1988, Ser. No. 212,733
Term of patent 14 years
U.S. Cl. D3—72



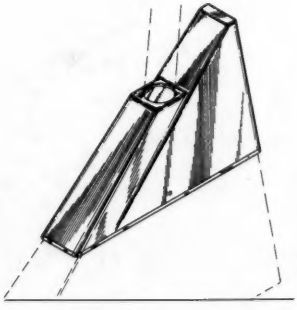
315,248
EARRING CARRYING BOX
Valerie Marshall, 2291 Jefferson Avenue, West Vancouver, British Columbia, Canada V7V 2A9
Filed May 18, 1987, Ser. No. 51,069
Term of patent 14 years
U.S. Cl. D3—75



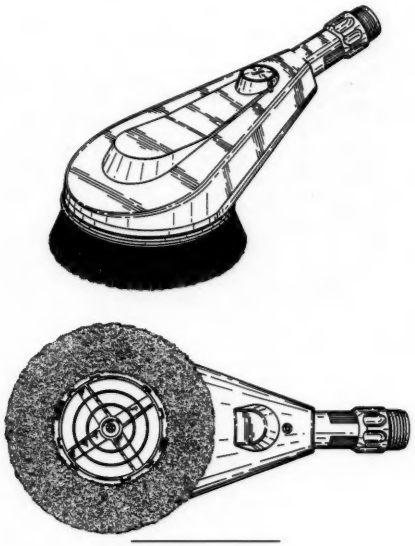
315,249
INSULATED MEDICAL BAG
Linda M. Tilson, 114 Island Cir., Sarasota, Fla. 34242
Filed Jan. 29, 1987, Ser. No. 8,396
Term of patent 14 years
U.S. Cl. D3—79



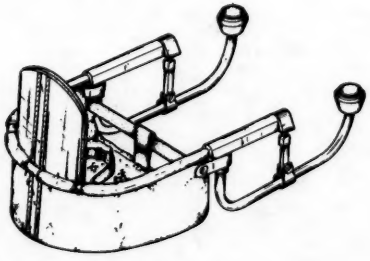
315,250
ANGLE BROOM SHROUD
Joseph Lapin, Montreal, Canada, assignor to Rubbermaid Incorporated, Wooster, Ohio
Filed Aug. 10, 1988, Ser. No. 230,510
Term of patent 14 years
U.S. Cl. D4—199



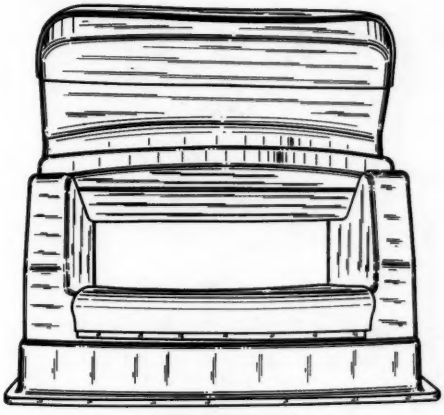
315,251
ROTATING WASHING BRUSH
Franco Clivio, Zürich, Switzerland, assignor to Gardena Kress + Kastner GmbH, Fed. Rep. of Germany
Filed Feb. 27, 1989, Ser. No. 315,699
Claims priority, application Fed. Rep. of Germany, Aug. 26, 1988, M 88 01 187.9
Term of patent 14 years
U.S. Cl. D4—115



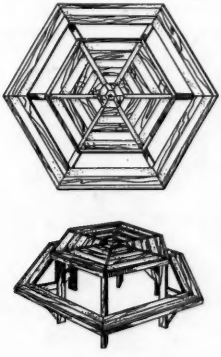
315,252
BABY SEAT
Ching-Chou Ho, No. 58, Ching Fong Street, Taipei, Taiwan
Filed Jun. 22, 1987, Ser. No. 64,777
Term of patent 14 years
U.S. Cl. D6—333



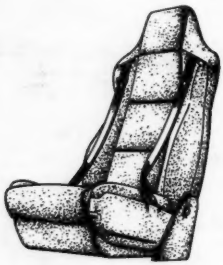
315,253
BOOSTER SEAT
James M. Kain, Tipp City, Ohio, assignor to Spalding & Evenflo Companies, Inc., Tampa, Fla.
Filed Aug. 11, 1987, Ser. No. 83,995
Term of patent 14 years
U.S. Cl. D6—333



315,254
PATIO TABLE
Lloyd Walters, R.R. 7, S-15, C-11, Vernon, British Columbia, Canada V1T 7Z3
Filed Aug. 25, 1986, Ser. No. 899,719
Claims priority, application Canada, Mar. 12, 1986, 12-03-86-1
Term of patent 14 years
U.S. Cl. D6—337



315,255
VEHICLE SEAT OR SIMILAR ARTICLE
Frank Beermann, Kirchheim, Fed. Rep. of Germany, assignor to Keiper Recaro GmbH & Co., Fed. Rep. of Germany
Filed Mar. 2, 1988, Ser. No. 163,062
Claims priority, application Fed. Rep. of Germany, Sep. 8, 1987, 2MR922
Term of patent 14 years
U.S. Cl. D6—356



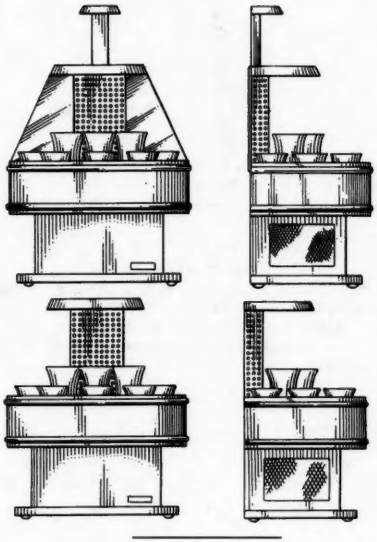
315,256
ARM CHAIR
Leo Martin, Miami, Fla., assignor to Miami Metal Products, Inc., Miami, Fla.
Filed Apr. 18, 1988, Ser. No. 182,745
Term of patent 14 years
U.S. Cl. D6—358

315,257
CHAIR
Willi Hensel, Willingen; Jurgen Lange, Grafenau, and Reinhard Paulus, Cologne, all of Fed. Rep. of Germany, assignors to Mauser Waldeck AG, Waldeck, Fed. Rep. of Germany
Division of Ser. No. 38,798, Apr. 15, 1987. This application Mar. 8, 1990, Ser. No. 490,819
Claims priority, application Fed. Rep. of Germany, Oct. 15, 1986, 1AR52/86
Term of patent 14 years
U.S. Cl. D6—366

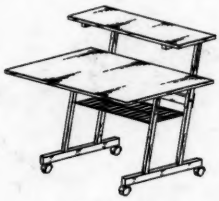
315,258
ARM CHAIR
Terrance Gibbs, Nyack, N.Y., assignor to Omni Products International, Inc., Fairfield, N.J.
Filed Oct. 15, 1987, Ser. No. 108,737
Term of patent 14 years
U.S. Cl. D6—379

315,259
CHAIR
Willi Hensel, Willingen; Jurgen Lange, Grafenau, and Reinhard Paulus, Cologne, all of Fed. Rep. of Germany, assignors to Mauser Waldeck AG, Waldeck, Fed. Rep. of Germany
Filed Mar. 8, 1990, Ser. No. 490,820
Claims priority, application Fed. Rep. of Germany, Oct. 15, 1986, 1AR52/86
Term of patent 14 years
U.S. Cl. D6—380

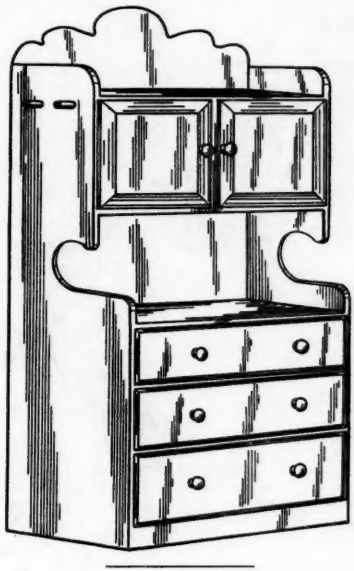
315,260
FLOWER COOLER STAND
James B. Kelly, Chittenango, N.Y., assignor to Floratech Industries, Inc., N. Syracuse, N.Y.
Filed Aug. 24, 1987, Ser. No. 88,244
Term of patent 14 years
U.S. Cl. D6—405



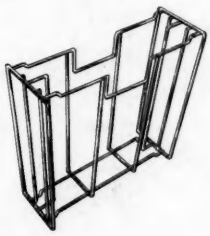
315,261
COMPUTER TABLE
Hoe S. Ng, and Kim S. Chua, both of 319-H, Lorong Buang Kok, Singapore (1954)
Filed Jul. 15, 1987, Ser. No. 73,546
Term of patent 14 years
U.S. Cl. D6—426



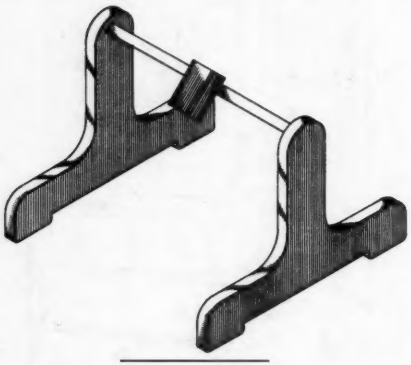
315,262
CABINET OR SIMILAR ARTICLE
Robert L. Denningham, 1976 Cambridge Dr., Crofton, Md. 21114
Filed Oct. 28, 1986, Ser. No. 924,491
Term of patent 14 years
U.S. Cl. D6—438



315,263
STORAGE RACK FOR PORTABLE CONTAINER
Henry B. David, Woodland Hills, Calif., assignor to Melco Wire Products Company, Glendale, Calif.
Filed Nov. 2, 1987, Ser. No. 115,183
Term of patent 14 years
U.S. Cl. D6—462



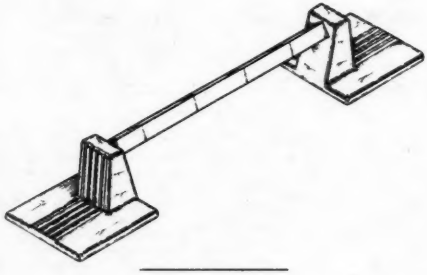
315,264
BABY BOTTLE HOLDER
Paul W. Rives, Roy, and John B. Sereika, Brigham City, both of Utah, assignors to Third Hand Corporation, Brigham City, Utah
Filed Nov. 23, 1987, Ser. No. 123,985
Term of patent 14 years
U.S. Cl. D6—466



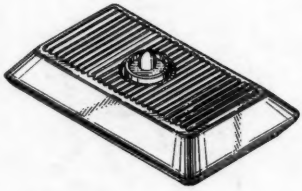
315,265
FURNITURE LEG
John W. T. Duffey, 491 Seminole Ave., Apartment 10, Atlanta, Ga. 30307
Filed May 24, 1988, Ser. No. 197,902
Term of patent 14 years
U.S. Cl. D6—495

315,266
FURNITURE LEG
John W. T. Duffey, 491 Seminole Ave., Apartment 10, Atlanta, Ga. 30307
Filed May 24, 1988, Ser. No. 197,903
Term of patent 14 years
U.S. Cl. D6—495

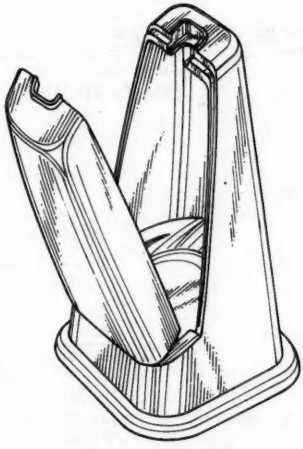
315,267
TOWEL RACK
E. Pekka Korpijsako, Rocky Hill, N.J., assignor to Willette Corporation, New Brunswick, N.J.
Filed Aug. 2, 1989, Ser. No. 388,556
Term of patent 14 years
U.S. Cl. D6—549

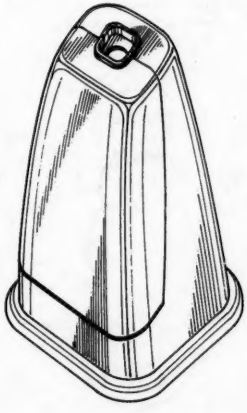


315,268
LIQUID SOAP DISPENSING CONTAINER
Jerome I. Lindauer, Hillsdale, N.J., assignor to International Flavors & Fragrances, New York, N.Y.
Filed Dec. 13, 1988, Ser. No. 283,831
Term of patent 14 years
U.S. Cl. D6—542

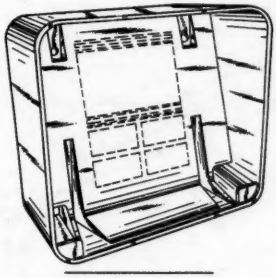


315,269
TOILET BOWL BRUSH CADDY
William E. Brazis, Medina, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio
Filed Jan. 13, 1989, Ser. No. 297,266
Term of patent 14 years
U.S. Cl. D6—551

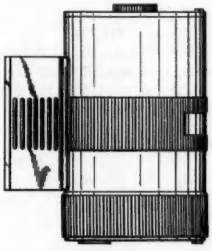




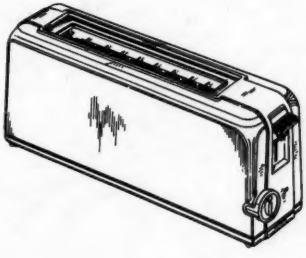
315,270
NEWSPAPER VENDING BIN OR SIMILAR ARTICLE
Milton J. Merl, New City, N.Y., assignor to Gannett Co., Inc., Arlington, Va.
Filed Aug. 14, 1987, Ser. No. 85,416
Term of patent 14 years
U.S. Cl. D6—567



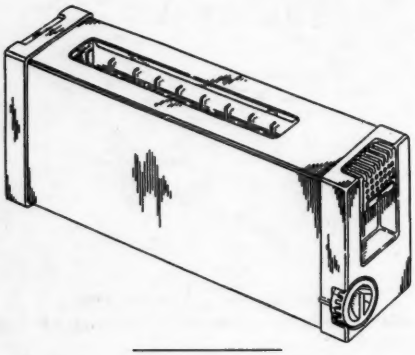
315,271
FOOD OR BEVERAGE HEATING POT
Howard L. Rauch, 13 Cedarwood La., Old Saybrook, Conn. 06475
Division of Ser. No. 943,289, Dec. 17, 1986, Pat. No. Des. 306,246. This application Jun. 6, 1989, Ser. No. 362,353
Term of patent 14 years
U.S. Cl. D7—317



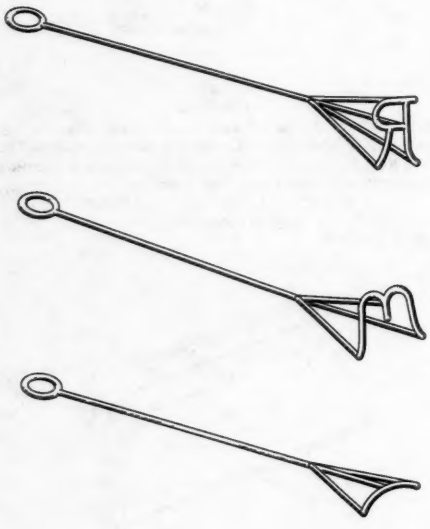
315,272
TOASTER
Devin L. Moore, Decatur, Ga.; R. Scott Myerly; Terry L. Myers, both of Richmond, Va.; David S. Rowley, Atlanta, Ga., and Kurt J. Sonnentag, Oradell, N.J., assignors to Hamilton Beach/Proctor-Silex, Inc., Glen Allen, Va.
Filed Oct. 11, 1988, Ser. No. 256,383
Term of patent 14 years
U.S. Cl. D7—330



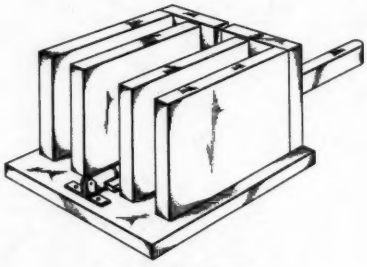
315,273
TOASTER
R. Scott Myerly, Richmond, Va., and Donald G. Wolfe, Lake Barrington, Ill., assignors to Hamilton Beach/Proctor-Silex, Inc., Glen Allen, Va.
Filed Oct. 3, 1988, Ser. No. 252,866
Term of patent 14 years
U.S. Cl. D7—330



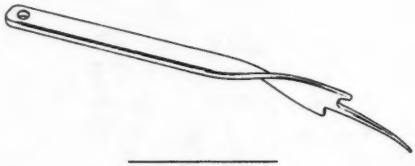
315,274
GRILL BRANDING IRONS
Marcia A. Pilgeram, P.O. Box 52, Gold Creek, Mont. 59733
Filed Nov. 6, 1986, Ser. No. 927,685
Term of patent 14 years
U.S. Cl. D7—672



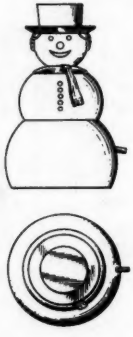
315,275
BAGEL CUTTER
Abdul Aziz, 82-67 Austin St., Apt. #412, Kew Gardens, N.Y. 11415, and Jesse L. Colodner, Pearl River, N.Y., assignors to Abdul Aziz, Kew Gardens, N.Y.
Filed Dec. 16, 1988, Ser. No. 285,866
Term of patent 14 years
U.S. Cl. D7—673



315,276
COMBINED SHRIMP PEELER AND DEVEINER TOOL
Raymond L. McCoy, 150 Cunningham, Lumberton, Tex. 77656
Filed Mar. 9, 1989, Ser. No. 321,450
Term of patent 14 years
U.S. Cl. D7—693



315,277
BOTANICAL WATERER FOR CHRISTMAS TREES OR THE LIKE
George D. Meixel, 462 Riegelsville Rd., Milford, N.J. 08848
Filed Jun. 6, 1990, Ser. No. 533,716
Term of patent 14 years
U.S. Cl. D8—1



315,278

HAND OPERATED CRIMPING TOOL

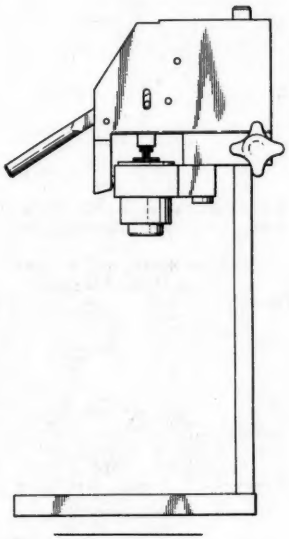
James A. Baxter, 73a Friern Barnet Lane, London N20 0XT, and Kenneth E. Marshall, Pinfold House, Almond Close, Barby, Rugby, Warwickshire CV23 8TL, both of United Kingdom

Filed May 26, 1988, Ser. No. 198,915

Claims priority, application United Kingdom, Nov. 27, 1987, 1046686

Term of patent 14 years

U.S. Cl. D8—51



315,279

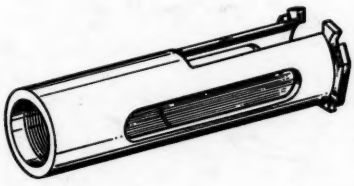
NOSE PIECE FOR AIRFEED PECK DRILL

John F. Stewart; Joseph F. Carter, and James A. Maass, all of Lexington, S.C., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Oct. 30, 1987, Ser. No. 116,126

Term of patent 14 years

U.S. Cl. D8—61



315,280

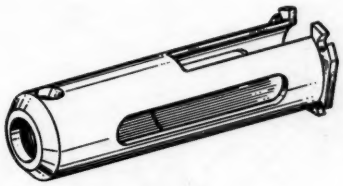
NOSE PIECE FOR AIRFEED PECK DRILL

John F. Stewart; Joseph F. Carter, and James A. Maass, all of Lexington, S.C., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Oct. 30, 1987, Ser. No. 116,127

Term of patent 14 years

U.S. Cl. D8—61



315,281

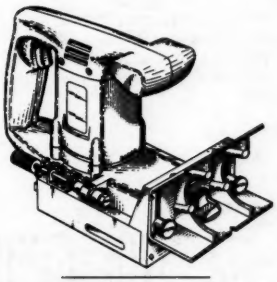
PLATE JOINER

Donald R. Bosten, Jackson, and Randy G. Cooper, Milan, both of Tenn., assignors to Porter Cable Corporation, Jackson, Tenn.

Filed Aug. 19, 1987, Ser. No. 87,250

Term of patent 14 years

U.S. Cl. D8—64



315,282

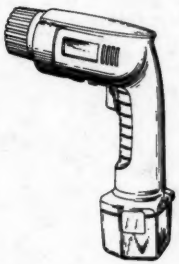
CORDLESS DRIVER/DRILL OR SIMILAR ARTICLE

Michael A. Schmidt, and John A. Bradley, both of Milwaukee, Wis., assignors to Milwaukee Electric Tool Corporation, Brookfield, Wis.

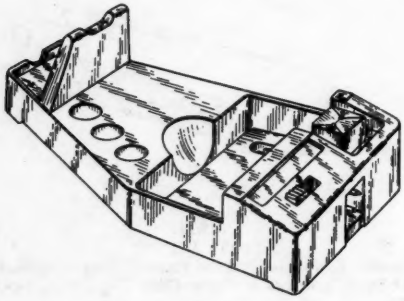
Filed Feb. 24, 1988, Ser. No. 160,078

Term of patent 14 years

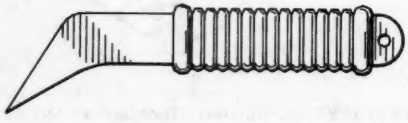
U.S. Cl. D8—68



315,283
COMBINED CORDLESS GLUE GUN STAND AND POWER BASE THEREFOR
Joseph P. De Carolis, Bristol, and Theodore P. Ciccone, III, West Hartford, both of Conn., assignors to The Stanley Works, New Britain, Conn.
Filed Jun. 13, 1988, Ser. No. 206,334
Term of patent 14 years
U.S. Cl. D8—71

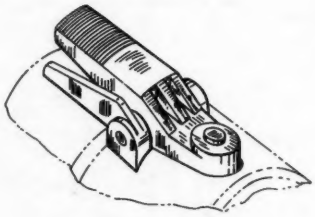


315,284
EXTRACTOR TOOL
Glen Parks, Rte. 3, Box 58 AB, Clarksville, Ark. 72830
Filed Oct. 19, 1987, Ser. No. 110,507
Term of patent 14 years
U.S. Cl. D8—98

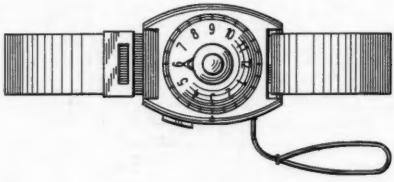


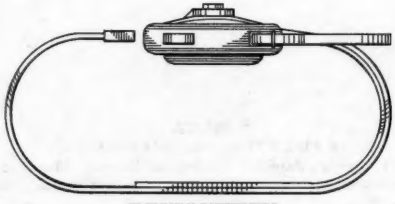
315,285
HANDLE
David E. Workman, Evergreen, Colo., assignor to Samsonite Corporation, Denver, Colo.
Filed Apr. 2, 1987, Ser. No. 39,995
Term of patent 14 years
U.S. Cl. D8—317

315,286
LOCK FOR AN EXTENSION POLE
Howard Graves, Berlin, Ohio, assignor to The Wooster Brush Company, Wooster, Ohio
Filed Jan. 29, 1988, Ser. No. 150,328
Term of patent 14 years
U.S. Cl. D8—331

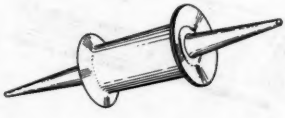


315,287
LOCKABLE STRAP FOR THEFT PREVENTION
Jean M. Lambert, C.P. 415, Lavaltrie, Quebec, Canada J0K 1H0
Filed Nov. 8, 1988, Ser. No. 268,527
Term of patent 14 years
U.S. Cl. D8—333

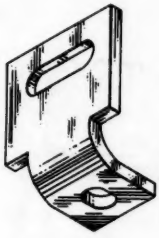




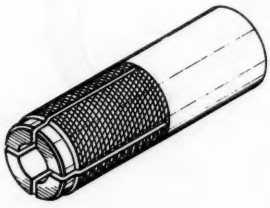
315,288
SPOOL
Frank Alonso, 29458 Blue Water Rd., Malibu, Calif. 90265
Filed Jan. 28, 1986, Ser. No. 823,336
Term of patent 14 years
U.S. Cl. D8—358



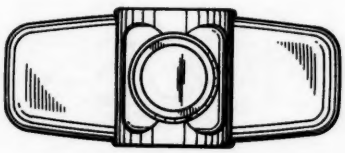
315,289
BICYCLE AIR PUMP MOUNT
Kevin G. Rankin, 10426 Danube, Granada Hills, Calif. 91344
Filed Jan. 20, 1988, Ser. No. 124,765
Term of patent 14 years
U.S. Cl. D8—373



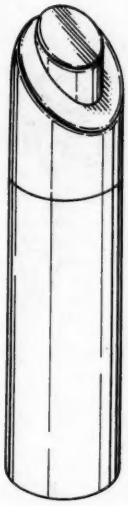
315,290
ANCHOR FASTENER
Akio Ikuta, Tokyo, Japan, assignor to KFC Ltd., Tokyo, Japan
Filed Mar. 20, 1987, Ser. No. 28,332
Term of patent 14 years
U.S. Cl. D8—385



315,291
BOTTLE WITH PUMP DISPENSER
Lee Spelling, 22 Cain Dr., Plainview, N.Y. 11803
Filed Apr. 16, 1987, Ser. No. 38,921
Term of patent 14 years
U.S. Cl. D9—300



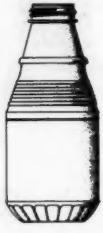
315,292
SPRAY DISPENSER
Richard H. Seager, Mystic, Conn., assignor to MB Group plc, Reading, England
Filed Oct. 6, 1988, Ser. No. 254,297
Term of patent 14 years
U.S. Cl. D9—300



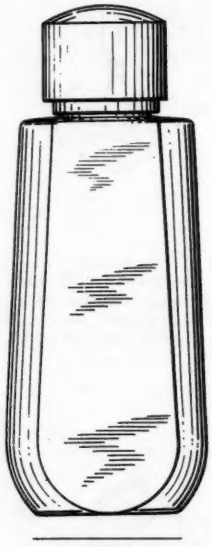
315,293
BOTTLE
Luciano Moglia, Borgaro Torinese, Italy, assignor to VISET S.p.A., Milan, Italy
Filed Apr. 22, 1987, Ser. No. 41,372
Term of patent 14 years
U.S. Cl. D9—336

315,294
COMBINED EDIBLE FLOWER AND PACKAGE THEREFOR
Maria M. Young, and Jacqueline C. Lizana, both of 12810 SW. 17th St., Miami, Fla. 33175
Filed Apr. 18, 1988, Ser. No. 183,035
Term of patent 14 years
U.S. Cl. D9—337

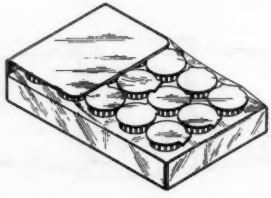
315,295
BOTTLE
John S. Reece; Timothy J. Beechuk, both of Cincinnati, Ohio; John Pardo, Yonkers, N.Y., and Samuel Ross, Jr., Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio
Filed Jun. 29, 1988, Ser. No. 213,220
Term of patent 14 years
U.S. Cl. D9—370



315,296
COMBINED BOTTLE AND CAP
Henri C. De Giovellina, Paris, France, assignor to Pochet S.A., Paris, France
Filed Mar. 6, 1988, Ser. No. 202,908
Claims priority, application France, Dec. 4, 1987, 87 7258
Term of patent 14 years
U.S. Cl. D9—389

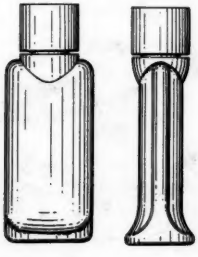


315,297
PACKAGE FOR DAIRY PRODUCTS
Craig L. Campbell, 21390 Juniper Ave., Forest Lake, Minn. 55025
Filed Jun. 17, 1987, Ser. No. 63,292
Term of patent 14 years
U.S. Cl. D9—341

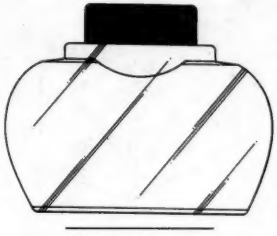


315,298
CONTAINER FOR WET WIPES
N. Dominic Marucci, Philadelphia, Pa., assignor to Scott Paper Company, Philadelphia, Pa.
Filed Mar. 7, 1988, Ser. No. 165,200
Term of patent 14 years
U.S. Cl. D9—381

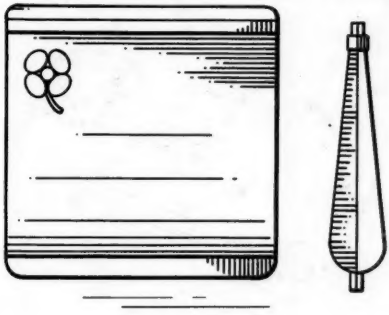
315,299
COMBINED BOTTLE AND CAP
Joseph Gerardiello, Succasunna, N.J., assignor to Guest Supply, Inc., North Brunswick, N.J.
Filed Jul. 7, 1988, Ser. No. 216,431
Term of patent 14 years
U.S. Cl. D9—403



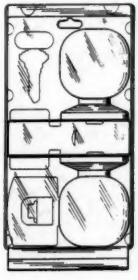
315,300
COMBINED PERFUME BOTTLE AND CLOSURE
Pierre Dinand, Levallois-Perret, France, assignor to Diana De Silva Cosmetiques SpA, Italy
Filed Oct. 18, 1988, Ser. No. 259,629
Claims priority, application France, Apr. 20, 1988, 88 2598
Term of patent 14 years
U.S. Cl. D9—403



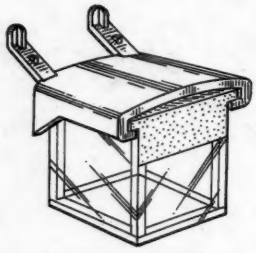
315,301
CONTRACEPTIVE SPONGE CONTAINER
Patrice A. Carpenter, 180 Kimberly Way, Marietta, Ga. 30064
Filed Nov. 21, 1988, Ser. No. 274,041
Term of patent 14 years
U.S. Cl. D9—414



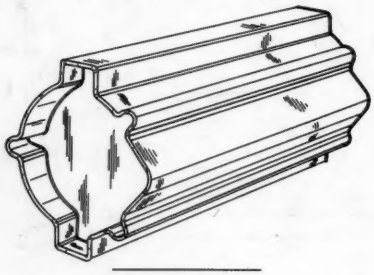
315,302
DISPLAY PACKAGE FOR LOCKSET
Karen Kistler, Walnut Creek, Calif., assignor to Schlage Lock Company, San Francisco, Calif.
Filed Jan. 11, 1988, Ser. No. 142,395
Term of patent 14 years
U.S. Cl. D9—415



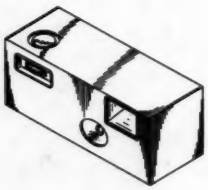
315,303
PEGBOARD BOX
Frank J. Lang, Lemont Rd., Lemont, Ill. 60439
Filed Sep. 1, 1987, Ser. No. 92,334
Term of patent 14 years
U.S. Cl. D9—418



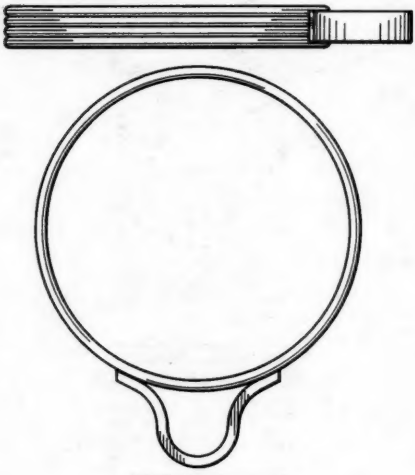
315,304
CONTAINER
Michel Courtois, St. Gratien, and Jacques Fillon, Chelles, both of France, assignors to Cebal, Clichy, France
Filed Nov. 16, 1988, Ser. No. 271,850
Claims priority, application Int'l Pat. Institute, May 16, 1988, DM/010/948
Term of patent 14 years
U.S. Cl. D9—424



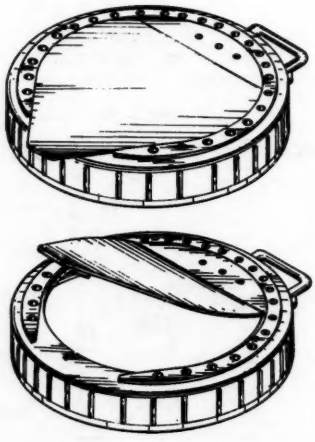
315,305
PACKAGE FOR A DISPOSABLE CAMERA
Takuya Arai, and Kimiaki Nakada, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan
Filed Dec. 30, 1986, Ser. No. 947,962
Claims priority, application Japan, Jun. 30, 1986, 61-25409; Jun. 30, 1986, 61-25410
The portion of the term of this patent subsequent to Dec. 11, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—432



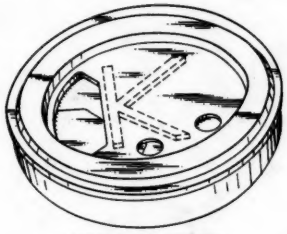
315,306
SHAVING RAZOR HOLDING DEVICE
Thomas L. Reister, 1321 Echo Rd., Vestal, N.Y. 13850
Filed Nov. 8, 1988, Ser. No. 268,524
Term of patent 14 years
U.S. Cl. D9—434



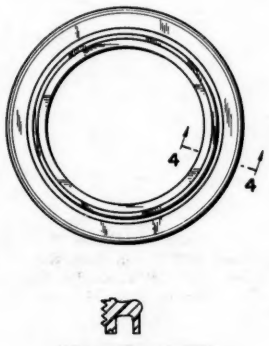
315,307
CONTAINER CLOSURE
J. Michael Kanyer, 20237 N.E. 163rd St., Woodinville, Wash. 98072
Filed Oct. 18, 1988, Ser. No. 259,111
Term of patent 14 years
U.S. Cl. D9—447



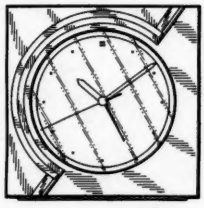
315,308
DISPENSING CLOSURE
John vanKerkhoven, Wausau, Wis., assignor to Specialty Packaging Group, Inc., Wausau, Wis.
Filed Feb. 29, 1988, Ser. No. 161,669
Term of patent 14 years
U.S. Cl. D9—450



315,309
PLASTIC INTERNALLY THREADED CONTAINER INSERT
Gary M. Baughman, Auburn, Ind., assignor to Rieke Corporation, Auburn, Ind.
Filed Jun. 4, 1987, Ser. No. 57,861
Term of patent 14 years
U.S. Cl. D9—456



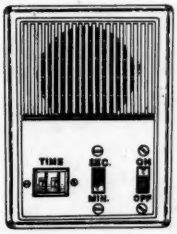
315,310
CLOCK
Motoyuki Suzuki, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Sep. 3, 1987, Ser. No. 92,703
Claims priority, application Japan, Mar. 4, 1987, 62-8114
Term of patent 14 years
U.S. Cl. D10—25



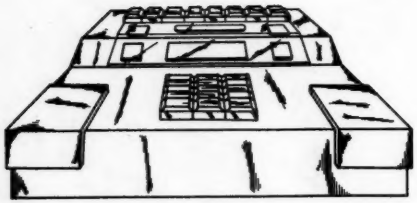
315,311
WRISTWATCH
Michel P. Ratajski, Bienne, Switzerland, assignor to Severin Montres AG, Zug, Switzerland
Filed Jun. 1, 1987, Ser. No. 57,155
Claims priority, application United Kingdom, Dec. 8, 1986, DMA/000558
Term of patent 14 years
U.S. Cl. D10—32

315,312
WRIST WATCH
Eric Bonnet, La Chaux de Fonds, Switzerland, assignor to Eco Swiss S.p.A., Milan, Italy
Filed Nov. 12, 1987, Ser. No. 119,418
Claims priority, application Hague, May 12, 1987, DM/008 632
Term of patent 14 years
U.S. Cl. D10—32

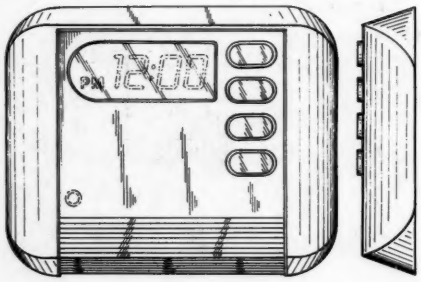
315,313
DIGITAL TIMER
Robert L. Bell, 452 Sapphire Dr., Sarasota, Fla. 33580
Filed Apr. 11, 1988, Ser. No. 180,035
Term of patent 14 years
U.S. Cl. D10—40



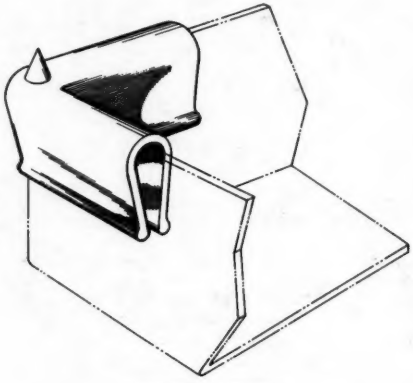
315,314
ELECTRONIC SCOREKEEPER HOUSING
Robert J. Mayes, 701 Grattan, Stockton, Calif. 95205
Filed Mar. 29, 1988, Ser. No. 174,637
Term of patent 14 years
U.S. Cl. D10—461



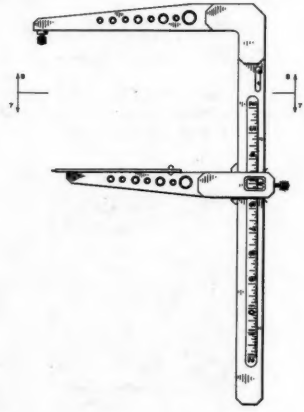
315,315
CONTROL UNIT FOR WHIRLPOOL BATHS OR THE LIKE
Henry M. Stairs, Jr., Neshanic, N.J., assignor to American Standard Inc., New York, N.Y.
Filed Sep. 30, 1987, Ser. No. 103,574
Term of patent 14 years
U.S. Cl. D10—50



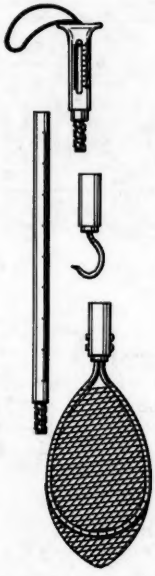
315,316
DRYWALL MARKER
Jeffery S. Reynolds; Cindy L. Reynolds, both of 5114 Rock Eagle Dr., Stone Mountain, Ga. 30083; Danny M. Reynolds, and Dara Reynolds, both of 4286 Linda La., Lilburn, Ga. 30247
Filed Dec. 8, 1988, Ser. No. 281,471
Term of patent 14 years
U.S. Cl. D10—64



315,317
MARKING CALIPER
John L. McFarland, 5385 S. 2000 West, Roy, Utah 84067
Filed Oct. 31, 1988, Ser. No. 264,681
Term of patent 14 years
U.S. Cl. D10—73

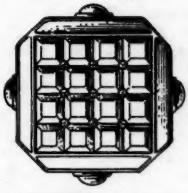


315,318
COMBINED HANDLE AND SCALE FOR A LANDING NET OR GAFF
Arthur L. Hitchcock, II, P.O. Box 193, Ulysses, Kans. 67880
Filed Oct. 5, 1987, Ser. No. 104,483
Term of patent 14 years
U.S. Cl. D10—89

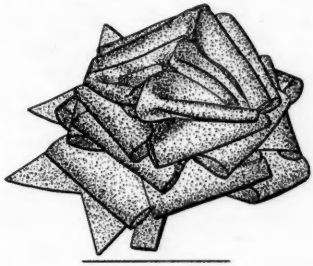


315,319
WATCH BEZEL
Eddy Schoepfer, La Chaux-de-Milieur, Switzerland, assignor to Fabrique Ebel, Societe Anonyme, La Chaux-de-Fonds, Switzerland
Filed Nov. 20, 1987, Ser. No. 123,164
Claims priority, application World Int. Prop. O., May 21, 1987, DM/008683
Term of patent 14 years
U.S. Cl. D10—128

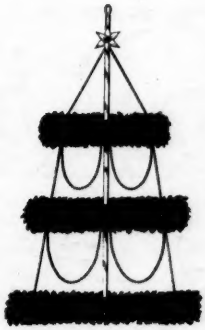
315,320
BROOCH
Paolo Bulgari, Rome, Italy, assignor to Partecipazione Bulgari S.p.A., Rome, Italy
Filed Jul. 13, 1988, Ser. No. 218,036
Claims priority, application World Int. Prop. O., Jan. 14, 1988, DM/010065
Term of patent 14 years
U.S. Cl. D11—40



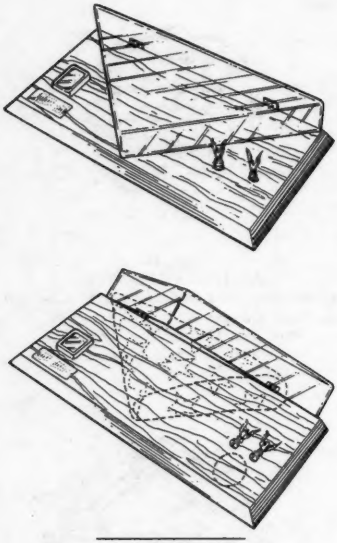
315,321
ARTIFICIAL FLOWER
Ryuji Aoyama, Nagoya, Japan, assignor to Kabushiki Kaisha Aoyama, Nagoya, Japan
Filed Aug. 12, 1987, Ser. No. 84,708
Term of patent 14 years
U.S. Cl. D11—117



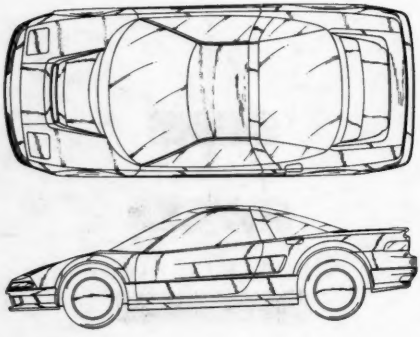
315,322
THREE-TIERED CHRISTMAS WREATH
Mary C. Guberman, c/o Kensington Designs, Inc., 11508 Applejack Ct., Cincinnati, Ohio 45241
Filed Jul. 13, 1988, Ser. No. 218,763
Term of patent 14 years
U.S. Cl. D11—120



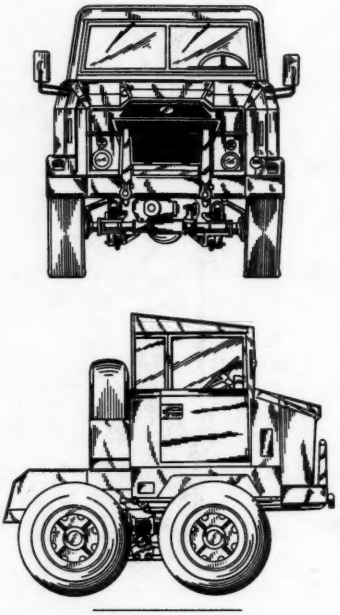
315,323
COMBINED FLAG DISPLAY CASE AND MEMORIAL PLAQUE
Kathleen M. Bailey, P.O. Box 34, Pittman, Nev. 89044
Filed Oct. 5, 1989, Ser. No. 418,409
Term of patent 14 years
U.S. Cl. D11—131



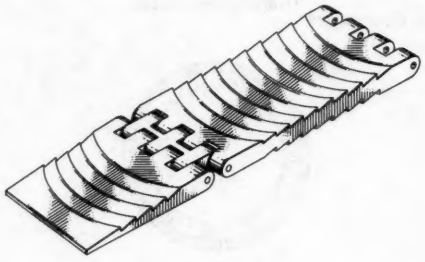
315,324
AUTOMOBILE
Kazuhiro Ichinose; Naoki Kusano, and Hiroyuki Kawase, all of Tokyo, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Dec. 23, 1988, Ser. No. 289,976
Term of patent 14 years
U.S. Cl. D12—92



315,325
VEHICLE
Paul Legueu, 85 Avenue Mazy, 44380 Pornichet, France
Filed Feb. 8, 1988, Ser. No. 153,598
Claims priority, application France, Jan. 22, 1988, 88 0400
Term of patent 14 years
U.S. Cl. D12—96

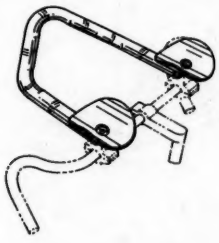


315,326
VEHICLE TRACTION MAT
Arnold W. Pinto, 2205 Gemini Dr., Bastrop, La. 71220
Filed Nov. 9, 1988, Ser. No. 269,003
Term of patent 14 years
U.S. Cl. D12—154

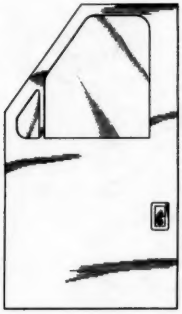


315,327
VEHICLE HOOD
George J. Tisten, Elkhart, and Donald J. Wilson, Granger, both of Ind., assignors to Holiday Rambler Corporation, Wakarusa, Ind.
Division of Ser. No. 262,481, Oct. 25, 1988, Pat. No. D. 309,281.
This application Apr. 18, 1989, Ser. No. 340,168
Term of patent 14 years
U.S. Cl. D12—173

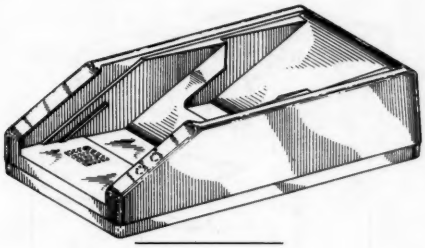
315,328
COMBINED AUXILIARY BAR AND ARMRESTS FOR ATTACHMENT TO A BICYCLE HANDLEBAR
Edward H. Giard, Jr., Chicago, Ill., assignor to Profile for Speed, Inc., Chicago, Ill.
Filed Jun. 29, 1989, Ser. No. 373,776
Term of patent 14 years
U.S. Cl. D12—178



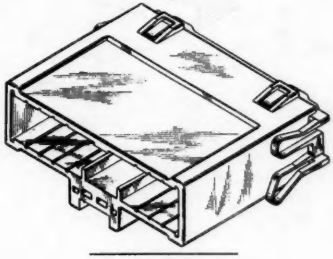
315,329
VEHICLE DOOR PANEL EXTERIOR SURFACE
George J. Tisten, Elkhart; Donald J. Wilson, and Eugene A. Dylewski, II, both of Granger, all of Ind., assignors to Holiday Rambler Corp., Wakarusa, Ind.
Division of Ser. No. 262,481, Oct. 25, 1988, Pat. No. D. 309,281.
This application Apr. 7, 1989, Ser. No. 334,991
Term of patent 14 years
U.S. Cl. D12—196



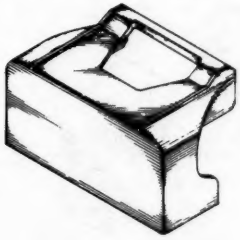
315,330
BATTERY CHARGER OR SIMILAR ARTICLE
Leonid Soren, Lincolnwood; Gary R. Weiss, Wheeling, and Albert L. Nagele, Wilmette, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Oct. 27, 1988, Ser. No. 264,304
Term of patent 14 years
U.S. Cl. D13—107



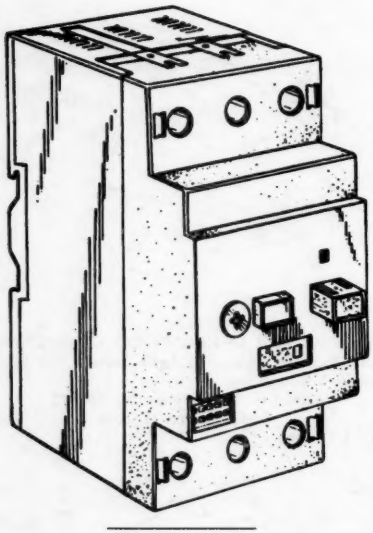
315,331
HOUSING FOR AN ELECTRICAL CONNECTOR
Takayuki Yamamoto, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan
Filed Dec. 22, 1987, Ser. No. 136,872
Term of patent 14 years
U.S. Cl. D13—146



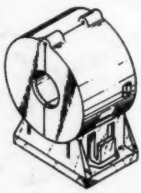
315,332
COVER FOR ELECTRICAL CONNECTOR
Fumio Kumagai, and Masataka Ohishi, both of Toyota, Japan, assignors to Yazaki Corp., Japan
Filed Oct. 13, 1987, Ser. No. 108,296
Term of patent 14 years
U.S. Cl. D13—156



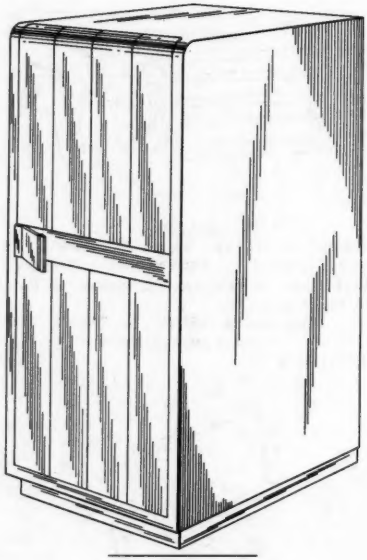
315,333
CIRCUIT BREAKER FOR ELECTRIC MOTOR
René Barbier, Quetigny, and Serge Guenin, Talant, both of France, assignors to La Telemecanique Electrique, France
Filed Jul. 28, 1988, Ser. No. 225,317
Claims priority, application France, Jan. 28, 1988, 88 0525
Term of patent 14 years
U.S. Cl. D13—160



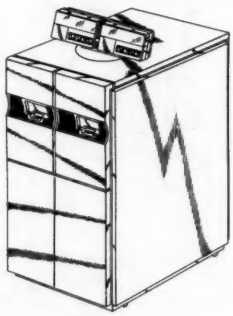
315,334
ABSORBER OF ELECTRIC NOISE
Akio Fujioka, Ichikawa, Japan, assignor to Kitagawa Industries Co., Ltd., Japan
Division of Ser. No. 187,515, Apr. 28, 1988, Pat. No. 4,882,561.
This application Jul. 7, 1989, Ser. No. 376,537
Term of patent 14 years
U.S. Cl. D13—199



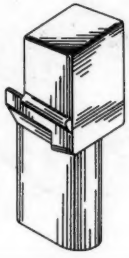
315,335
COMPUTER BOX
Ivar Frischer, Gothenburg, Sweden, assignor to E. A. Rosengren AB, Gothenburg, Sweden
Filed May 27, 1988, Ser. No. 200,174
Claims priority, application Sweden, Nov. 30, 1987, 87-2845
Term of patent 14 years
U.S. Cl. D14—102



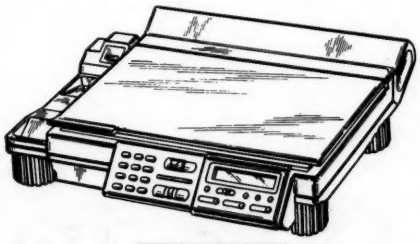
315,336
MAGNETIC TAPE UNIT
Masami Watari, Kanagawa, and Makoto Tsuchida, Yokohama, both of Japan, assignors to Fujitsu Limited, Kanagawa, Japan
Filed Mar. 17, 1988, Ser. No. 169,344
Claims priority, application Japan, Sep. 30, 1987, 62-40176
Term of patent 14 years
U.S. Cl. D14—108



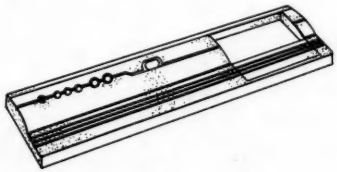
315,337
HOUSING FOR AN ELECTRONIC BAR CODE READER
Frederick M. Weaver, 3610 Columbine Cir., Charlotte, N.C. 28211, and Donna E. Goodner, 3427 Teversham La., Charlotte, N.C. 28210
Division of Ser. No. 252,123, Sep. 30, 1988, Pat. No. D. 311,393.
This application Jun. 26, 1990, Ser. No. 545,337
Term of patent 14 years
U.S. Cl. D14—116



315,338
FACSIMILE
Tsutomu Yoshihara, Ayase, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Apr. 5, 1988, Ser. No. 176,987
Claims priority, application Japan, Oct. 7, 1987, 62-41257
Term of patent 14 years
U.S. Cl. D14—118



315,339
FRONT PANEL FOR A COMPUTER
Fang Ting Yang, Hsin-Tien, Taiwan, assignor to Autocomputer Co., Ltd., Taiwan
Filed Feb. 21, 1989, Ser. No. 312,576
Term of patent 14 years
U.S. Cl. D14—115

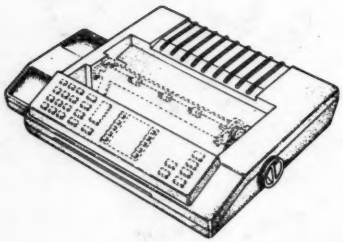


315,340
FACSIMILE
Masaki Takahashi, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 23, 1989, Ser. No. 299,525
Claims priority, application Japan, Jul. 22, 1988, 63-29345
Term of patent 14 years
U.S. Cl. D14—118

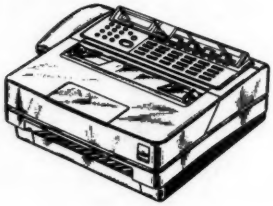
315,341
FACSIMILE
Hiroshi Komatsu, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jul. 10, 1989, Ser. No. 377,196
Claims priority, application Japan, Jan. 12, 1989, 1-875
Term of patent 14 years
U.S. Cl. D14—118

315,342
FACSIMILE
Tsutomu Yoshihara, Ayase, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Aug. 14, 1989, Ser. No. 393,330
Claims priority, application Japan, Feb. 16, 1989, 1-5915
Term of patent 14 years
U.S. Cl. D14—118

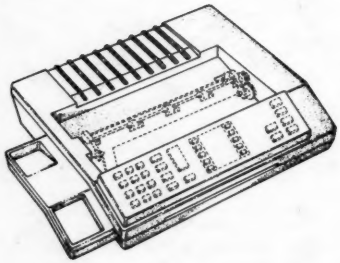
315,343
FACSIMILE TRANSCEIVER
Arlan K. Andrews, Indianapolis, Ind.; David C. Danielson, New Canaan, Conn., and John N. McGarvey, Drexel Hill, Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.
Filed Aug. 11, 1989, Ser. No. 394,788
Term of patent 14 years
U.S. Cl. D14—118

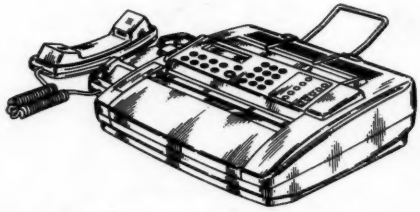


315,344
FACSIMILE
Tsutomu Yoshihara, Ayase, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Oct. 24, 1989, Ser. No. 425,993
Claims priority, application Japan, Apr. 25, 1989, 1-15508
Term of patent 14 years
U.S. Cl. D14—118

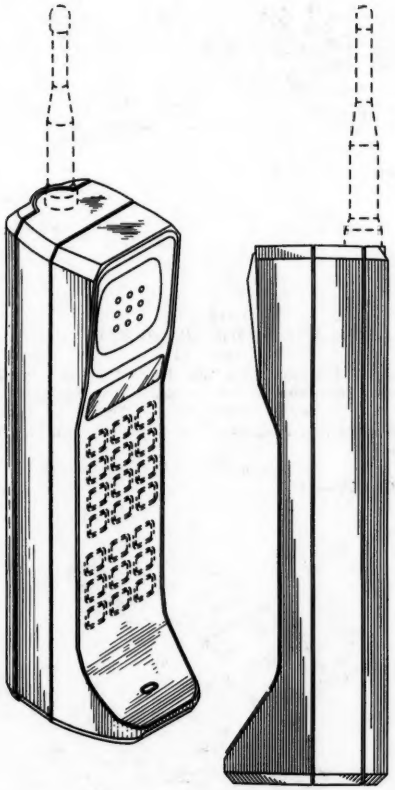


315,345
INTEGRAL FACSIMILE AND TELEPHONE
Kunio Hara, Chiba, and Shin-ichi Hiroki, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Division of Ser. No. 137,002, Dec. 23, 1987. This application Oct. 27, 1989, Ser. No. 427,354
Claims priority, application Japan, Jun. 25, 1987, 62-25628; Jun. 25, 1987, 62-25629
Term of patent 14 years
U.S. Cl. D14—118

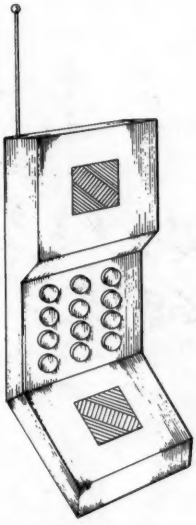




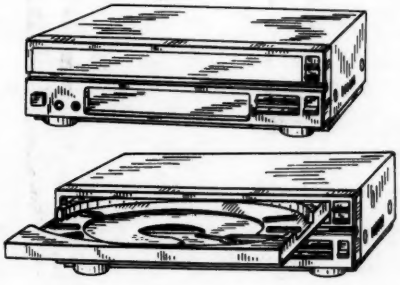
315,346
PORTABLE RADIOTELEPHONE OR SIMILAR ARTICLE
Albert L. Nagele, Wilmette, Ill., assignor to Motorola, Inc., Schaumburg, Ill.
Filed Dec. 14, 1989, Ser. No. 451,273
Term of patent 14 years
U.S. Cl. D14—138



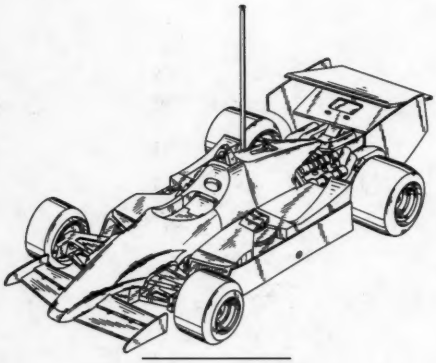
315,347
PORTABLE TELEPHONE/COMPUTER OR SIMILAR ARTICLE
Robin G. Walker, 3620 Mosby Dr., Greensboro, N.C. 27407
Filed Jun. 20, 1989, Ser. No. 369,664
Term of patent 14 years
U.S. Cl. D14—147



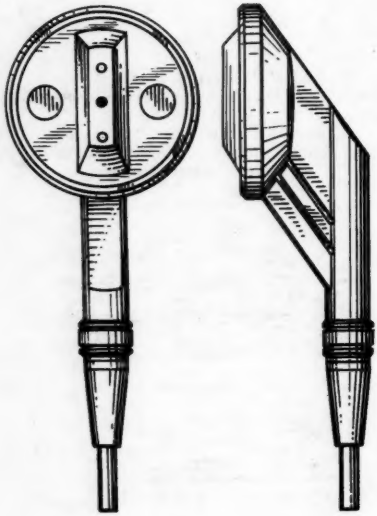
315,348
DIGITAL DISK PLAYER
Isao Wada, Chiba, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed May 12, 1988, Ser. No. 193,360
Claims priority, application Japan, Nov. 12, 1987, 62-46358
Term of patent 14 years
U.S. Cl. D14—156



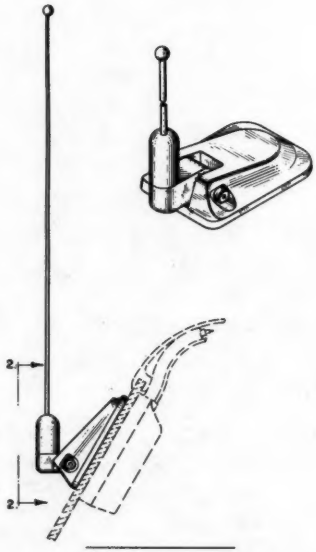
315,349
COMBINED RADIO AND CLOCK
Shintaro Tsuji, Tokyo, Japan, assignor to Sanrio Company, Ltd., Tokyo, Japan
Filed Oct. 27, 1988, Ser. No. 263,516
Term of patent 14 years
U.S. Cl. D14—171



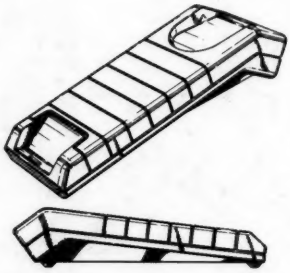
315,350
EARPHONE
Tameaki Ikeda, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Dec. 18, 1987, Ser. No. 134,902
Term of patent 14 years
U.S. Cl. D14—223



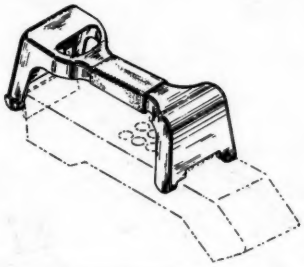
315,351
ANTENNA FOR A CELLULAR TELEPHONE
Herb Velazquez, Villa Park, Ill., assignor to The Antenna Company, Broadview, Ill.
Filed May 16, 1988, Ser. No. 194,577
Term of patent 14 years
U.S. Cl. D14—234



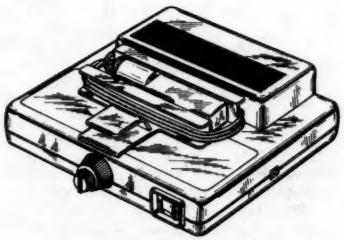
315,352
BASE FOR A TELEPHONE HANDSET OR SIMILAR ARTICLE
Carlton M. Langton, Nottingham, England, assignor to GEC Plessey Telecommunications Limited, Coventry, England
Filed Jul. 13, 1989, Ser. No. 379,446
Claims priority, application United Kingdom, Jan. 19, 1989, 1056483
Term of patent 14 years
U.S. Cl. D14—251



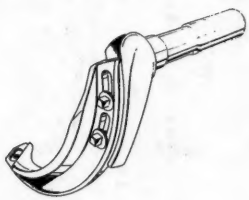
315,353
SHOULDER REST FOR TELEPHONE HANDSET OR THE LIKE
Donald L. Greenwood, Sr., 3117 Lakeshore Dr., and Donald L. Greenwood, Jr., 2200 Tulip St., both of Longmont, Colo. 80501
Filed Nov. 27, 1989, Ser. No. 441,415
Term of patent 14 years
U.S. Cl. D14—253



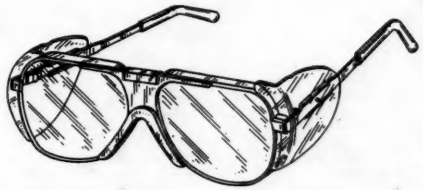
315,354
BOOK READER FOR THE BLIND
Eiichi Yoshioka, Abiko; Nobuyoshi Katayama, Tokyo, and Hirohiko Katayama, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Apr. 12, 1988, Ser. No. 180,797
Claims priority, application Japan, Jan. 29, 1988, 63-3371
Term of patent 14 years
U.S. Cl. D14—299



315,355
DEBARKING TOOL
Lennart Magnusson, Iggesund, Sweden, assignor to Mecania AB, Hudiksvall, Sweden
Filed Sep. 19, 1988, Ser. No. 246,174
Claims priority, application Sweden, Jun. 8, 1988, 88-1411
Term of patent 14 years
U.S. Cl. D15—28



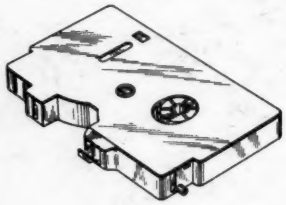
315,356
SAFETY SPECTACLES
Richard Hirschman, Albertson, N.Y., assignor to Hudson Optical Corporation, Bohemia, N.Y.
Filed May 9, 1988, Ser. No. 191,484
Term of patent 14 years
U.S. Cl. D16—102



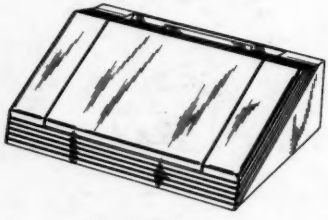
315,357
COMBINED MAGNETIC STILL DISC CAMERA AND VIDEO RECORDER
Atsushi Fukutomi, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan
Filed Nov. 10, 1987, Ser. No. 119,414
Claims priority, application Japan, May 18, 1987, 62-19391
Term of patent 14 years
U.S. Cl. D16—202

315,358
ELECTRONIC CALCULATOR WITH PRINTER
Takahisa Yubisui; Hiroshi Sakaguchi, and Keiichi Koyama, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jun. 23, 1988, Ser. No. 210,127
Claims priority, application Japan, Dec. 29, 1987, 62-53603
Term of patent 14 years
U.S. Cl. D18—7

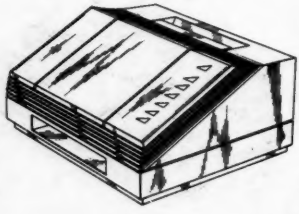
315,359
INK RIBBON CASSETTE FOR ELECTRONIC TYPEWRITER
Seiichi Omino, Tokyo, and Hideo Sugimura, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 10, 1988, Ser. No. 269,557
Claims priority, application Japan, May 11, 1988, 63-18742
Term of patent 14 years
U.S. Cl. D18—12



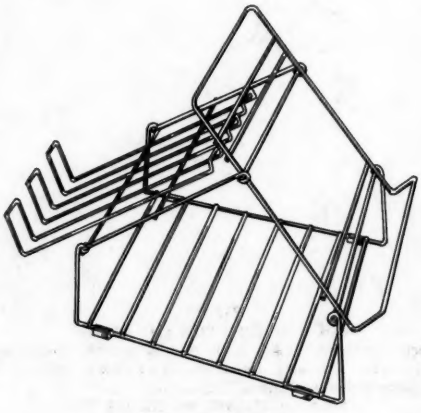
315,360
PRINTER FOR COMPUTER
Hiroyuki Tokuda; Tatsuo Kojima, both of Yokohama, and Masaaki Sakai, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 23, 1989, Ser. No. 299,523
Claims priority, application Japan, Jul. 22, 1988, 63-29349
Term of patent 14 years
U.S. Cl. D18—13



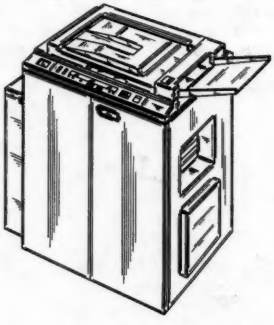
315,361
PRINTER FOR COMPUTER
Tatsuo Kojima, and Hiroyuki Tokuda, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Apr. 17, 1989, Ser. No. 338,757
Claims priority, application Japan, Oct. 17, 1988, 63-40836
Term of patent 14 years
U.S. Cl. D18—13



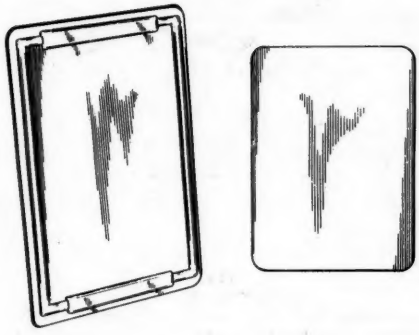
315,362
COMBINED PRINTER STAND AND PAPER TRAY
Walter Chieng, No. 12, Alley 18, Lane 277, Chung-Shan North Road, Sec. 6, Taipei, Taiwan
Filed Apr. 24, 1989, Ser. No. 342,375
Term of patent 14 years
U.S. Cl. D18—23



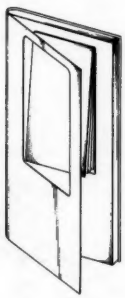
315,363
COPYING MACHINE
Mikio Kosako, and Youchi Tatsuta, Osaka, both of Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jan. 14, 1988, Ser. No. 144,853
Claims priority, application Japan, Jul. 17, 1987, 62-29332
The portion of the term of this patent subsequent to Jan. 10, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D18—39



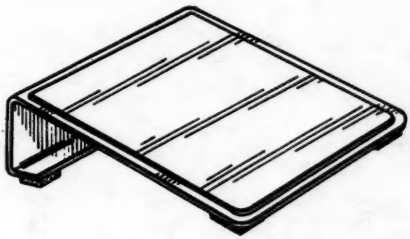
315,364
PROFILE CARD
John J. Scalice, New York, and John O. Bosworth, Upper Nyack, both of N.Y., assignors to Design Network U.S.A., Inc., Fort Lee, N.J.
Filed Sep. 23, 1988, Ser. No. 249,077
Term of patent 14 years
U.S. Cl. D19—10



315,365
HOLDER FOR COUPONS, STAMPS OR THE LIKE
Brad A. McClain, Jr., 3714 Durness Way, Houston, Tex. 77025
Filed Apr. 27, 1989, Ser. No. 344,031
Term of patent 14 years
U.S. Cl. D19—26



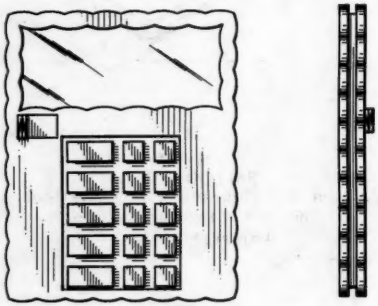
315,366
WRITING BOARD
Randy S. Greenspahn, Wilmette, Ill., assignor to Vertiflex Company, Chicago, Ill.
Filed Nov. 2, 1987, Ser. No. 115,359
Term of patent 14 years
U.S. Cl. D19—52



315,367
BALLOON GAME
Craig J. Lovik, 8565 Custer School Rd., Custer, Wash. 98240
Filed Mar. 3, 1988, Ser. No. 163,939
Term of patent 14 years
U.S. Cl. D21—1

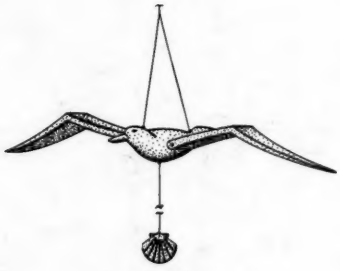
315,368
CURLING STONE
Takeshi Wakui, Tokyo, Japan, assignor to Tsukuda Original Co., Ltd., Tokyo, Japan
Filed Aug. 8, 1988, Ser. No. 229,554
Claims priority, application Japan, Apr. 5, 1988, 63-13638
Term of patent 14 years
U.S. Cl. D21—7

315,369
POCKET KENO COMPUTER
David A. Tayco, Sr., 26422 Underwood Ave., Hayward, Calif. 94544
Filed Nov. 8, 1988, Ser. No. 268,530
Term of patent 14 years
U.S. Cl. D21—37

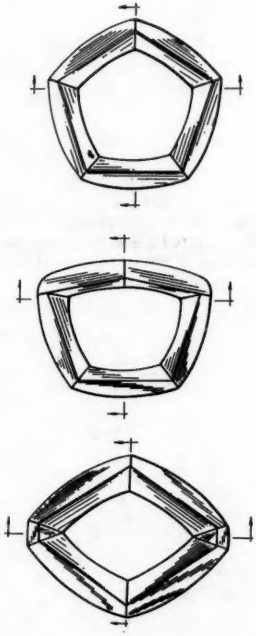


315,370
CHARACTER GAME PIECE FOR USE IN A BOARD GAME
Peter A. Adolph, 5 Arundel House, Clarence Road, Tunbridge Wells, Kent, TN1 1HG, United Kingdom
Filed Sep. 11, 1986, Ser. No. 906,007
Term of patent 14 years
U.S. Cl. D21—51

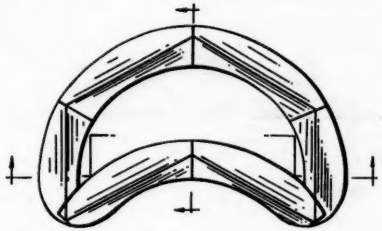
315,371
SIMULATIVE TOY MOBILE
Paul J. Van Risseghem, Cincinnati, Ohio, and George A. Van Risseghem, Little Falls, Minn., assignors to Van Toy & Novelty Co., Cincinnati, Ohio
Filed May 12, 1988, Ser. No. 193,495
Term of patent 14 years
U.S. Cl. D21—62



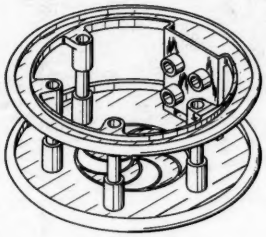
315,372
AERIAL TOY
Stephen Weiss, 570 S. Shore Dr., Miami Beach, Fla. 33141
Division of Ser. No. 263,601, Oct. 25, 1988, Pat. No. Des. 301,548. This application Jul. 13, 1990, Ser. No. 559,881
Term of patent 14 years
U.S. Cl. D21—86



315,373
AERIAL TOY
Stephen Weiss, 570 S. Shore Dr., Miami Beach, Fla. 33141
Division of Ser. No. 263,601, Oct. 25, 1988, Pat. No. Des. 301,548. This application Aug. 23, 1990, Ser. No. 559,882
Term of patent 14 years
U.S. Cl. D21—86

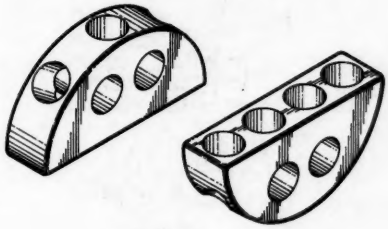


315,374
TOY CIRCUS WHEEL
Ib H. Berggreen, Vedbaek, Denmark, assignor to Interlego AG, Switzerland
Filed Nov. 29, 1988, Ser. No. 277,907
Term of patent 14 years
U.S. Cl. D21—108

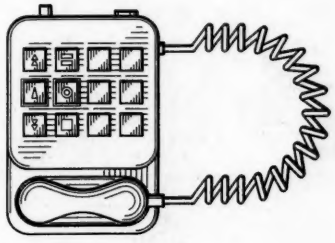


315,375
TOY CONSTRUCTION ELEMENT
Flemming H. Olsen, Espergaerde, Denmark, assignor to Interlego AG, Switzerland
Filed Aug. 15, 1989, Ser. No. 394,189
Claims priority, application Denmark, Feb. 24, 1989, MA02221989
Term of patent 14 years
U.S. Cl. D21—108

315,376
TOY BUILDING BLOCK
Anton Meyer, Gratzerstrasse 3, D-8000 Ingolstadt 2, Fed. Rep. of Germany
Division of Ser. No. 151,804, Feb. 3, 1988. This application Mar. 6, 1990, Ser. No. 489,591
Claims priority, application Fed. Rep. of Germany, Aug. 5, 1987, 10-17335
Term of patent 14 years
U.S. Cl. D21—108

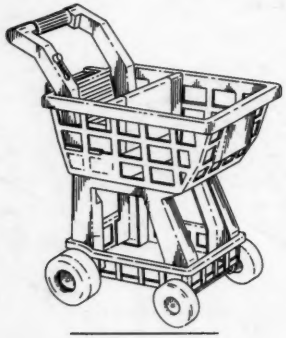


315,377
TOY TELEPHONE
Marylou Tharp, 2384 Cordelia Rd., and Gerry Farris, P.O. Box 57, both of Suisun, Calif. 94585
Filed Jul. 10, 1989, Ser. No. 377,300
Term of patent 14 years
U.S. Cl. D21—111



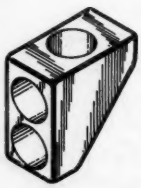
315,378
TOY VEHICLE
Robert Shaw, Piscataway, N.J., assignor to Kiddie Products, Inc., Avon, Mass.
Filed Sep. 7, 1988, Ser. No. 241,330
Term of patent 14 years
U.S. Cl. D21—128

315,379
TOY SHOPPING CART
Miriam Kolker, Buffalo, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Oct. 16, 1989, Ser. No. 421,694
Term of patent 14 years
U.S. Cl. D21—134



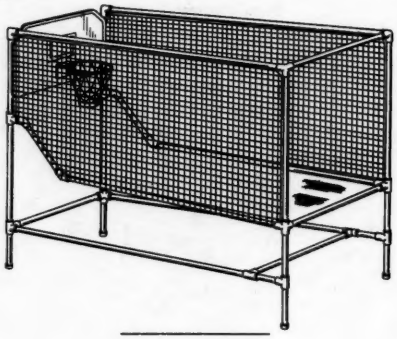
315,380
TOY VEHICLE JUMPING RAIL
Tsuyoshi Ueyama, and Hiroshi Hida, both of Tokyo, Japan, assignors to Tomy Company, Ltd., Tokyo, Japan
Filed Jul. 13, 1989, Ser. No. 379,161
Claims priority, application Japan, Jan. 13, 1989, 1-978
Term of patent 14 years
U.S. Cl. D21—143

315,381
TOY BUILDING BLOCK
Anton Meyer, Gratzerstrasse 3, D-8000 Ingolstadt 2, Fed. Rep. of Germany
Division of Ser. No. 151,804, Feb. 3, 1988. This application Mar. 6, 1990, Ser. No. 488,961
Claims priority, application Fed. Rep. of Germany, Aug. 5, 1987, 10-17335
Term of patent 14 years
U.S. Cl. D21—108



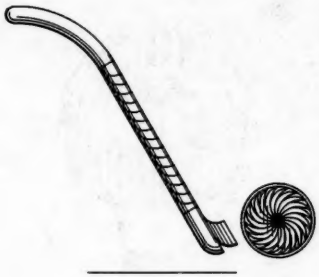
315,382
PORTABLE PITCHING MOUND
Kenneth L. Ragsdale, Rte. #2, Box 341-6, Frisco, Tex. 75034
Filed Jul. 27, 1987, Ser. No. 78,691
Term of patent 14 years
U.S. Cl. D21—199

315,383
COMBINED BASKETBALL GAME GOAL AND BALL RETURN
Ken C. Cochran; Alan J. Sias, and Donald R. Frye, all of Salinas, Kans., assignors to Pop-A-Shot, Inc., Salina, Kans.
Filed Jul. 12, 1988, Ser. No. 220,813
Term of patent 14 years
U.S. Cl. D21—201



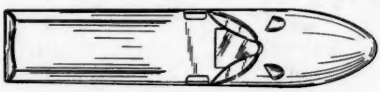
315,384
GOLF TEE
Paul W. Lankford, 2400 Grindley Park, Dearborn, Mich. 48124
Filed Jun. 27, 1988, Ser. No. 211,681
Term of patent 14 years
U.S. Cl. D21—208

315,385
TOY WHEEL IMPELLER
Claudis R. Middaugh, 2290 Belladonna St., Redding, Calif. 96002
Filed Mar. 2, 1988, Ser. No. 162,852
Term of patent 14 years
U.S. Cl. D21—210

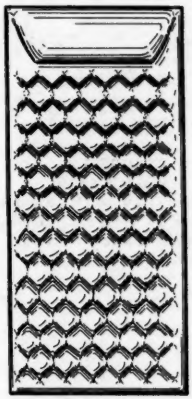


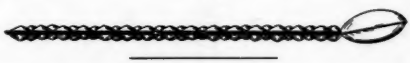
315,386
GOLF CLUB
Carlos S. Alonso, Av. Cantabria 33, 33, 28042 Madrid, Spain
Filed May 20, 1986, Ser. No. 867,262
Claims priority, application Spain, Nov. 29, 1985, 109500
Term of patent 14 years
U.S. Cl. D21—219

315,387
UNDERWATER VIEWING PADDLE BOARD
John R. Warren, 2401 NW. 63rd, Oklahoma City, Okla. 73116
Filed Sep. 22, 1988, Ser. No. 247,582
Term of patent 14 years
U.S. Cl. D21—236



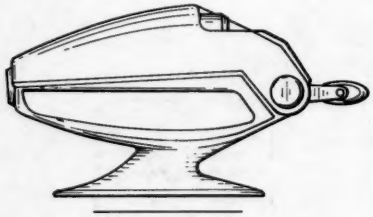
315,388
FLOAT OR THE LIKE
Fred A. Thomas, Clearwater Beach, Fla., assignor to Porpoise Pool and Patio, Inc., Clearwater, Fla.
Filed Aug. 17, 1989, Ser. No. 394,979
Term of patent 14 years
U.S. Cl. D21—237



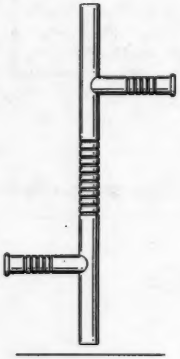


315,389
SHOE UPPER
Keith Spence, Los Angeles, Calif., assignor to L.A. Gear, Inc., Los Angeles, Calif.
Filed Feb. 1, 1990, Ser. No. 473,385
Term of patent 14 years
U.S. Cl. D2—314

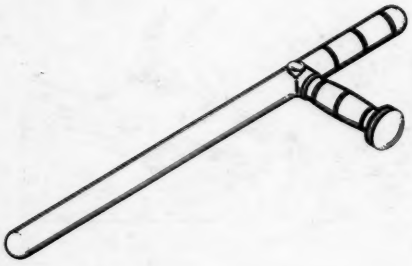
315,390
FISHING REEL
Robert J. Peterson, Claremore, Okla., assignor to Swede Industries, Okla.
Filed Jul. 6, 1988, Ser. No. 215,921
Term of patent 14 years
U.S. Cl. D22—141



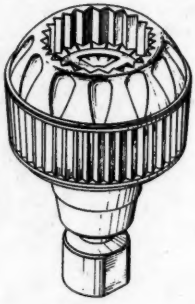
315,391
POLICE CLUB
Robert J. Fabrey, 7438 Oakwood Dr., Brookfield, Ohio 44403
Filed Apr. 24, 1989, Ser. No. 341,892
Term of patent 14 years
U.S. Cl. D22—117



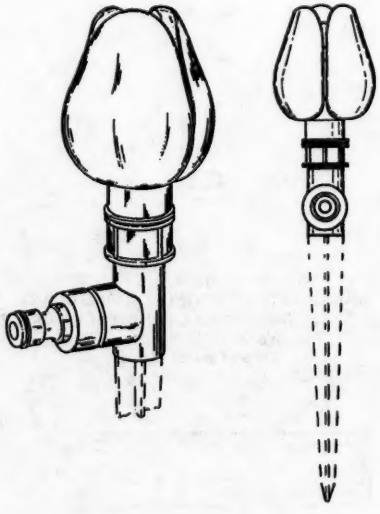
315,392
BATON
Wing G. Lew, 3664 Primavera Ave., Los Angeles, Calif. 90065
Filed Nov. 15, 1989, Ser. No. 436,670
Term of patent 14 years
U.S. Cl. D22—117



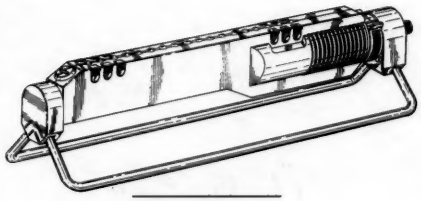
315,393
HEAD FOR A SHOWER OR HAND SPRAY
Constantin Presman, Bat-Yam, Israel, assignor to AMCOR Ltd., Tel Aviv, Israel
Filed Dec. 23, 1988, Ser. No. 290,286
Claims priority, application Israel, Aug. 18, 1988, 14084
Term of patent 14 years
U.S. Cl. D23—213



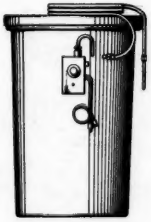
315,394
SPRINKLER
Ruggero Ferrari, 11/A Strada Naviglia, Parma, Italy 43100
Filed Aug. 2, 1980, Ser. No. 388,354
Claims priority, application Italy, Feb. 8, 1989, 28912/89[U]
Term of patent 14 years
U.S. Cl. D23—215



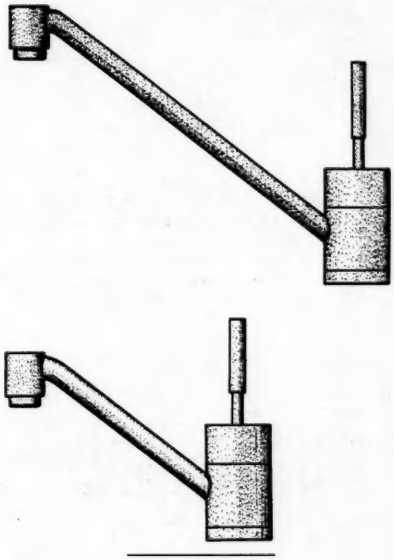
315,395
SPRINKLER
Franco Clivio, Zürich, Switzerland, assignor to Gardena Kress + Kastner GmbH, Fed. Rep. of Germany
Filed May 3, 1989, Ser. No. 347,321
Claims priority, application Fed. Rep. of Germany, Nov. 19, 1988, M8803391.0
Term of patent 14 years
U.S. Cl. D23—216



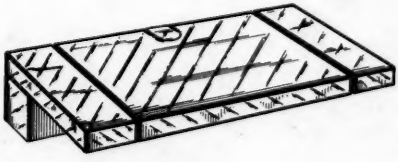
315,396
DISPENSING CONTAINER FOR APPLYING PREMEASURED MEDICATION TO LIVESTOCK
Michael L. Miller, Great Bend, Kans., assignor to Oilfield Manufacturer's Warehouse, Inc., Great Bend, Kans.
Filed Mar. 2, 1987, Ser. No. 20,335
Term of patent 14 years
U.S. Cl. D23—225



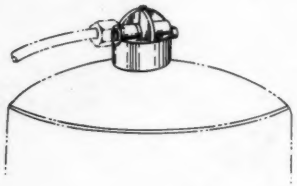
315,397
FAUCET
Alfons Knapp, Biberach an der Riss, Fed. Rep. of Germany, assignor to Masco Corporation, Taylor, Mich.
Filed Nov. 20, 1987, Ser. No. 123,655
Term of patent 14 years
U.S. Cl. D23—238



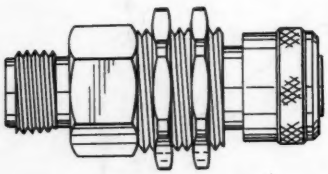
315,398
BATHROOM FAUCET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Inc., Melville, N.Y.
Filed May 1, 1987, Ser. No. 45,016
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—241



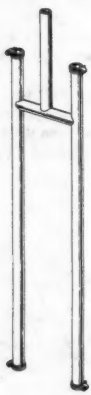
315,399
TANK SHUT-OFF VALVE
Bruce D. Burrows, 25581 Via Paladar, Valencia, Calif. 91355
Filed Feb. 21, 1989, Ser. No. 312,582
Term of patent 14 years
U.S. Cl. D23—248



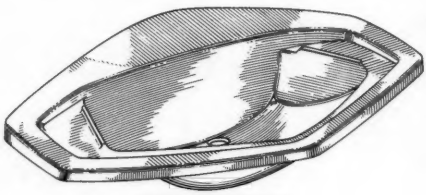
315,400
QUICK-CONNECT COUPLING FOR A BULKHEAD
Richard J. Medvick, Shaker Heights, Ohio, assignor to Swagelok Quick-Connect Co.
Filed Feb. 8, 1988, Ser. No. 153,652
Term of patent 14 years
U.S. Cl. D23—262



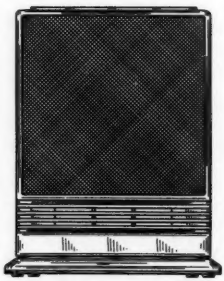
315,401
PROTECTOR FOR WASHING MACHINE HOSES
Brian K. Renner, Rte. 1, Cleveland, Mo. 64734
Filed Aug. 1, 1988, Ser. No. 226,961
Term of patent 14 years
U.S. Cl. D23—266



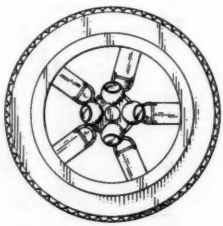
315,402
SINK
Scott G. Lenahan, 20140 Delight St., Canyon Country, Calif. 91351
Filed Feb. 12, 1987, Ser. No. 13,713
Term of patent 14 years
U.S. Cl. D23—294



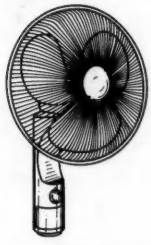
315,403
FAN HEATER
Mitsugu Ooki; Kiminori Yamaguchi, and Shinichi Yokoyama, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Nov. 21, 1989, Ser. No. 440,017
Claims priority, application Japan, May 31, 1989, 1-20189
Term of patent 14 years
U.S. Cl. D23—335



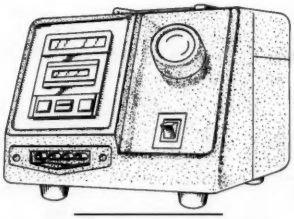
315,404
AIR CONDITIONING CEILING FAN
George Dufour, 821 NW. 57 Pl., Fort Lauderdale, Fla. 33309
Filed Nov. 3, 1988, Ser. No. 266,936
Term of patent 14 years
U.S. Cl. D23—377



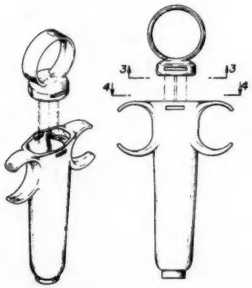
315,405
COMBINED WALL FAN AND LAMP
Ruey-Tarng Guo, No. 2, Sublane 99, Lane 274, Chong-chern s. Rd., Yung-Kung District, Tainan Shien, Taiwan
Filed Jun. 1, 1989, Ser. No. 360,208
Claims priority, application Australia, May 25, 1989, 1658/1989
Term of patent 14 years
U.S. Cl. D23—382



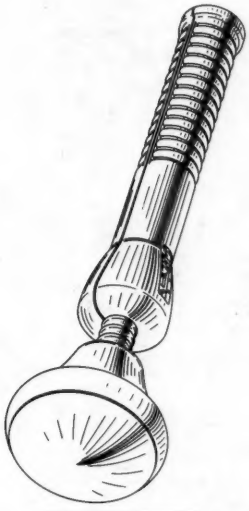
315,406
SEQUENTIAL COMPRESSION MONITOR FOR DEEP VEIN THROMBOSIS
John F. Dye, Elgin, Ill., assignor to The Kendall Company, Mansfield, Mass.
Filed Jun. 24, 1987, Ser. No. 66,686
Term of patent 14 years
U.S. Cl. D24—21



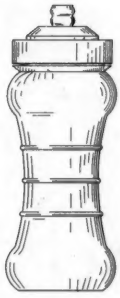
315,407
SYRINGE JACKET WITH PLUNGER HANDLE
Gary D. Bradrick, Camarillo, and Robert B. Guthrie, Oxnard, both of Calif., assignors to Spectramed, Inc., Oxnard, Calif.
Filed Apr. 26, 1988, Ser. No. 186,178
Term of patent 14 years
U.S. Cl. D24—25



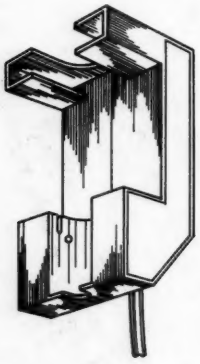
315,408
MASSAGER
Lam K. Duk, Sai kung, Hong Kong, assignor to Sealand Industrial Co., Ltd., Kowloon, Hong Kong
Filed Oct. 13, 1987, Ser. No. 106,765
Claims priority, application United Kingdom, Jun. 4, 1987, 1042632
Term of patent 14 years
U.S. Cl. D24—41



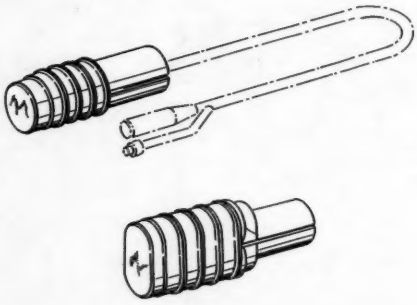
315,409
COMBINED BABY BOTTLE AND DISPOSABLE LINER
Michael G. Baarber, Tulsa, Okla., assignor to Schaffner Enterprises, Inc., Tulsa, Okla.
Filed Aug. 28, 1989, Ser. No. 399,758
Term of patent 14 years
U.S. Cl. D24—47



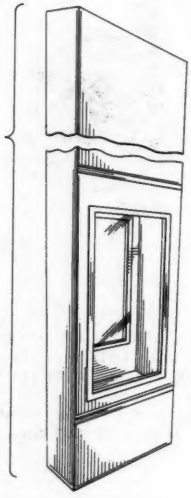
315,410
DETECTOR FOR USE IN MONITORING EMPTY INTRAVENOUS INFUSION CONTAINERS
Michael R. Aten, San Diego, Calif., assignor to Imed Corporation, San Diego, Calif.
Filed Jan. 19, 1989, Ser. No. 299,743
Term of patent 14 years
U.S. Cl. D24—51



315,411
URINARY CATHETER
Thomas H. Reif, 5213 Greencroft Dr., Dayton, Ohio 45426; Louis E. Warnken, 197 Lindall Dr., Germantown, Ohio 45327, and Roy A. Snyder, 8705 Cheshire Ct., Jessup, Md. 20794
Filed Mar. 14, 1988, Ser. No. 167,438
Term of patent 14 years
U.S. Cl. D24—54



315,412
FOOD DELIVERY CONVEYOR MODULE FOR DRIVE-IN RESTAURANTS
Edward F. Bavis, 201 Grandin Rd., Maineville, Ohio 45039
Filed Aug. 10, 1987, Ser. No. 83,089
Term of patent 14 years
U.S. Cl. D25—52



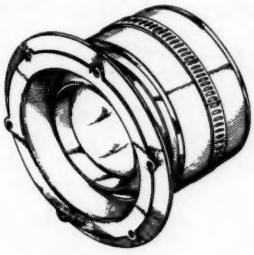
315,413
DOOR LIGHT
Roger C. Hall, Jasper, Tex., assignor to Visador Company, Jasper, Tex.
Filed Sep. 23, 1988, Ser. No. 248,213
Term of patent 14 years
U.S. Cl. D25—103

315,414
WINDOW COMPONENT EXTRUSION
Dennis Westphal, Galva, and Jonathan Piles, McPherson, both of Kans., assignors to CertainTeed Corporation, Valley Forge, Pa.
Filed Sep. 18, 1988, Ser. No. 246,190
The portion of the term of this patent subsequent to Nov. 13, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D25—119

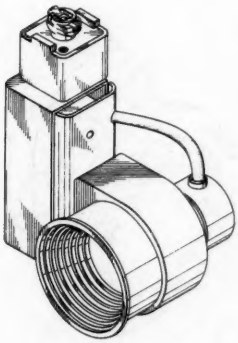
315,415
DECORATIVE VERTICAL SUPPORT
Richard Y. Anthony, and Nelta M. Anthony, both of 312 SW. Marsh Wren, Lee's Summit, Mo. 64082
Filed Aug. 22, 1989, Ser. No. 397,088
Term of patent 14 years
U.S. Cl. D25—126

315,416
BOAT COCKPIT LAMP
Theodore Ziaylek, Jr., 140 Riverview Dr., and Michael P. Ziaylek, 3 Brook La., both of Yardley, Pa. 19067
Filed Mar. 6, 1989, Ser. No. 319,227
Term of patent 14 years
U.S. Cl. D26—28

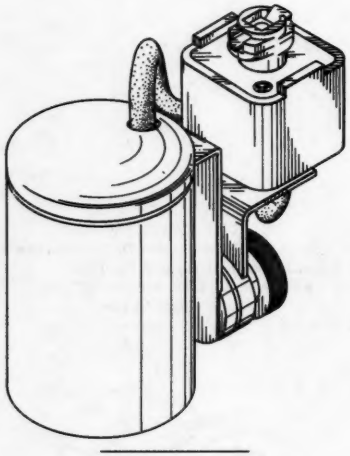
315,417
BOAT TRANSOM LIGHT
Theodore Ziaylek, Jr., 140 Riverview Dr., and Michael P. Ziaylek, 3 Brook La., both of Yardley, Pa. 19067
Filed Apr. 24, 1989, Ser. No. 343,191
Term of patent 14 years
U.S. Cl. D26—28



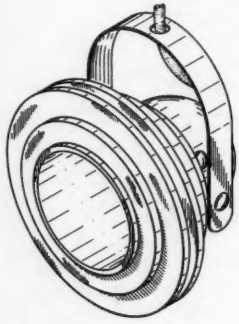
315,418
TRACK LIGHTING FIXTURE
Bruce N. Layne, Wheaton, Ill., assignor to Cooper Industries, Houston, Tex.
Filed Dec. 9, 1988, Ser. No. 282,353
Term of patent 14 years
U.S. Cl. D26—63



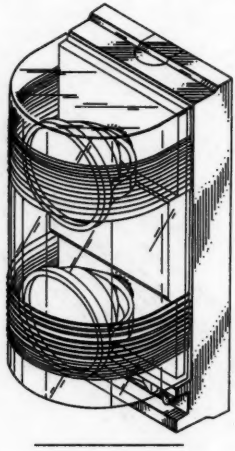
315,419
TRACK LIGHTING FIXTURE
Bruce N. Layne, Wheaton, Ill., assignor to Cooper Industries, Houston, Tex.
Filed Dec. 9, 1988, Ser. No. 282,354
Term of patent 14 years
U.S. Cl. D26—63



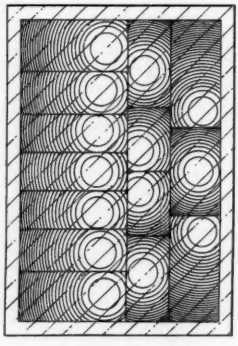
315,420
DUAL FLANGED HOUSING FOR TRACK LIGHTING FIXTURE
Bruce N. Layne, Wheaton, Ill., assignor to Cooper Industries, Houston, Tex.
Filed Apr. 7, 1989, Ser. No. 335,152
Term of patent 14 years
U.S. Cl. D26—63



315,421
WALL MOUNTED EMERGENCY LIGHTING UNIT
Willfred Goldschmidt, Weston, Conn., assignor to Emergi-Lite, Inc., Westbrook, Conn.
Filed Jan. 30, 1989, Ser. No. 304,401
Term of patent 14 years
U.S. Cl. D26—85



315,422
LENS ARRAY FOR PASSIVE INFRARED MOTION DETECTOR SYSTEMS OR THE LIKE
Ricahrd N. Claytor, and Truman D. Black, both of Arlington, Tex., assignors to Fresnel Technologies, Inc., Fort Worth, Tex.
Filed Oct. 11, 1988, Ser. No. 256,366
Term of patent 14 years
U.S. Cl. D26—122

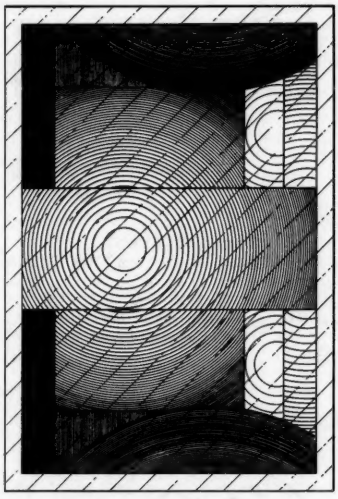


315,423

LONG RANGE FRESNEL LENS ARRAY FOR INFRARED MOTION DETECTOR SYSTEM

Richard N. Claytor, Arlington, and Russell G. Torti, Fort Worth, both of Tex., assignors to Fresnel Technologies, Inc., Fort Worth, Tex.

Filed Feb. 27, 1989, Ser. No. 316,433
Term of patent 14 years
U.S. Cl. D26—122

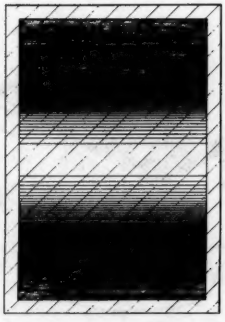


315,424

VERTICAL BARRIER FRESNEL LENS ARRAY FOR INFRARED MOTION DETECTOR SYSTEMS

Richard N. Claytor, Arlington, Tex., assignor to Fresnel Technologies, Inc., Fort Worth, Tex.

Filed Feb. 27, 1989, Ser. No. 316,435
Term of patent 14 years
U.S. Cl. D26—122

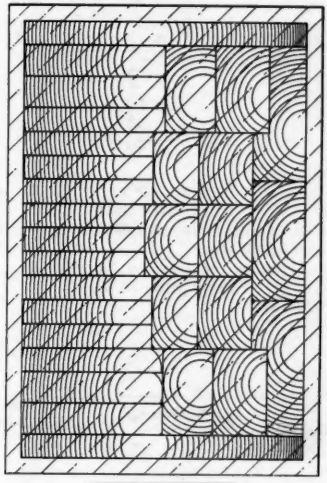


315,425

DENSE WIDE ANGLE FRESNEL LENS ARRAY FOR INFRARED MOTION DETECTOR SYSTEM

Richard N. Claytor, Arlington, and Russell G. Torti, Fort Worth, both of Tex., assignors to Fresnel Technologies, Inc., Fort Worth, Tex.

Filed Feb. 27, 1989, Ser. No. 316,436
Term of patent 14 years
U.S. Cl. D26—122

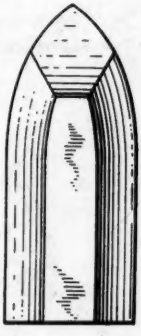


315,426

LIPSTICK OR SIMILAR ARTICLE

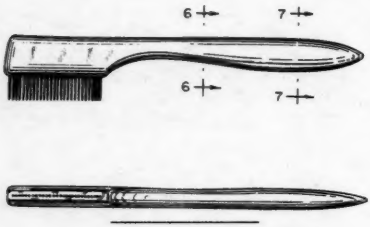
Arthur Pisani, and Robert Pisani, both of Kinnelon, N.J., assignors to Cavalla, Inc.

Filed Sep. 19, 1988, Ser. No. 245,533
Term of patent 14 years
U.S. Cl. D28—4

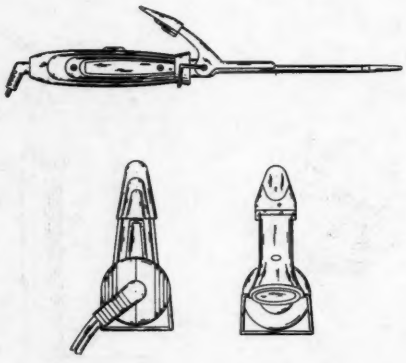


315,427
ARCHERY GLOVE OR SIMILAR ARTICLE
Timothy E. Lavell, 8809 19th St., West, Rock Island, Ill. 61201
Filed Nov. 10, 1987, Ser. No. 122,234
Term of patent 14 years
U.S. Cl. D29—22

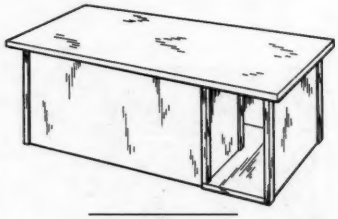
315,428
EYELASH COMB
Leslie Davies, Chirbury, United Kingdom, assignor to Sepralash Ltd., Sante Fe, N. Mex.
Filed Jan. 24, 1989, Ser. No. 301,735
Term of patent 14 years
U.S. Cl. D28—30



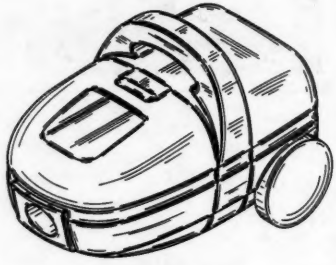
315,429
HAIR CURLING IRON
Edward Tichy, Woodbury, and Richard B. Studley, New Haven, both of Conn., assignors to Wahl Clipper Corporation, Sterling, Ill.
Filed Apr. 13, 1988, Ser. No. 181,246
Term of patent 14 years
U.S. Cl. D28—35



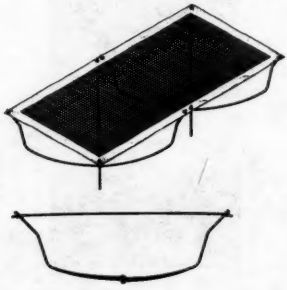
315,430
ANIMAL SHELTER
Arnold G. Robertson, Sr., 318 Woodcrest Dr., Norman, Okla. 73069
Filed Mar. 17, 1989, Ser. No. 325,348
Term of patent 14 years
U.S. Cl. D30—108



315,431
VACUUM CLEANER
Matafumi Ikeda; Chikashi Kuriya, and Mika Nakajima, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Jul. 26, 1988, Ser. No. 224,134
Claims priority, application Japan, Jan. 28, 1988, 63-3154
Term of patent 14 years
U.S. Cl. D32—21



315,432
SWEATER DRYER
Brenner E. Smith, Greenfield, Mass., assignor to J. H. Smith Co., Inc., Greenfield, Mass.
Filed Apr. 29, 1988, Ser. No. 187,877
Term of patent 14 years
U.S. Cl. D32—58

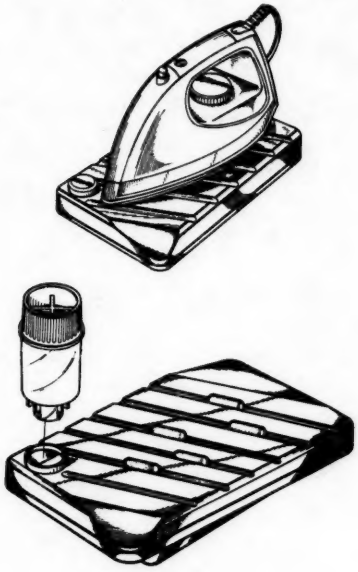


315,433

COMBINED ELECTRICAL STEAM IRON AND RESERVOIR BASE WITH FILTER ATTACHMENT

Tien-Lai Chen, 4 Fl., No. 20, Min Chuan West Rd., Taipei, Taiwan

Filed May 22, 1989, Ser. No. 355,306
Term of patent 14 years
U.S. Cl. D32—68



315,434

COMBINED IRON AND STAND AND WATER TANK UNIT

Pierre Paulin, Paris, France, assignor to Calor S.A. Place Ambroise Courtois

Filed Jul. 18, 1988, Ser. No. 220,467
Claims priority, application France, Jan. 25, 1988, 88 0431
Term of patent 14 years
U.S. Cl. D32—68

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TO WHOM

PATENTS WERE ISSUED ON THE 12TH DAY OF MARCH, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

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AB Volvo: *See—*
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Moss, Hans, 4,998,906, Cl. 474-153.000.

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Ahmad, Nawaz; Ziets, George A.; and Das, Sudeb, to Ortho Pharmaceutical Corporation. Long lasting contraceptive suppository composition and methods of use. 4,999,342, Cl. 514-54.000.

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Albert Schulte Sohne GmbH. & Co.: *See—*
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Greer, Larry J., 4,998,829, Cl. 384-255.000.
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Alloy Rods Global, Inc.: *See—*
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Arnold, William F.; and Arnold, Bill M., 4,998,982, Cl. 182-159.000.
Arnold, David: *See—*
Bellino, Joseph P.; Arnold, David; O'Brien, Dexter T.; and Goldman, Ira B., 4,999,464, Cl. 200-267.000.
Arnold, William F.; and Arnold, Bill M. Metal ladder construction with reinforced side rails. 4,998,982, Cl. 182-159.000.
Arnulf, Paul, to Salomon S.A. Ski binding having integral biasing and support members. 4,998,746, Cl. 280-615.000.
Artwohl, Paul: *See—*
Kostos, Jeffery; Kaspar, Melvin; and Artwohl, Paul, 4,998,382, Cl. 49-501.000.
Asahi Glass Company, Ltd.: *See—*
Kojima, Hiroaki; Ichiki, Toshio; Shibata, Shigehito; Harada, Takeshi; Hirano, Eiji; and Atsuta, Shoji, 4,999,147, Cl. 264-139.000.
Asahi Kasei Kogyo Kabushiki Kaisha: *See—*
Ikada, Yoshito; Konishi, Hikaru; Corretge, Eugene; and Imamura, Kazuo, 4,999,110, Cl. 210-490.000.
Asahi Kogaku Kogyo K.K.: *See—*
Iizuka, Takashi; Iima, Mitsunori; and Morimoto, Akira, 4,998,790, Cl. 350-6.100.
Asahi Kogaku Kogyo Kabushiki Kaisha: *See—*
Negishi, Kiyoshi; Negoro, Ikuo; and Kita, Masahiro, 4,998,835, Cl. 400-611.000.
Ueno, Fuminori; and Ohsawa, Yutaka, 4,999,661, Cl. 354-402.000.
Asahi, Toshinori: *See—*
Chida, Shohei; Kozaki, Masami; Asahi, Toshinori; Ono, Chiyoaki; Iwasa, Seiji; Fukunaga, Taizou; and Takemura, Moriyuki, 4,998,776, Cl. 299-59.000.
Asakura, Tetsuro; Demura, Makoto; and Kuroo, Takeshi, to Terumo Kabushiki Kaisha. Biocatalyst entrapped in a silk fibroin membrane. 4,999,295, Cl. 435-177.000.
Asakura, Tsutou: *See—*
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Suzuki, Tetsuji, 4,999,712, Cl. 358-213.110.
Asami, Fumitaka: *See—*
Aoki, Tetsuo; and Asami, Fumitaka, 4,999,708, Cl. 358-153.000.
Asano, Kozo: *See—*
Nakano, Hirofumi; Hara, Mitsunobu; Takahashi, Isami; Asano, Kozo; Iida, Takao; and Morimoto, Makoto, 4,999,196, Cl. 424-116.000.
Asbra, Andrew F. Gas leakage detector. 4,998,434, Cl. 73-40.50R.
ASCII Corporation: *See—*
Ishii, Takatoshi, 4,999,620, Cl. 340-799.000.
Asghar, Safdar M.; and Bartkowiak, John G., to Advanced Micro Devices, Inc. Apparatus having a modular decimation architecture. 4,999,626, Cl. 341-126.000.
Ash, James J., to Chemcut Corporation. Process and apparatus for treating articles and preventing their wrap around a roller. 4,999,079, Cl. 156-345.000.
Ashbee, Kenneth H. G., to University of Tennessee Research Corporation. Bi-dimensional compression method. 4,999,156, Cl. 419-5.000.
Asmo Co., Ltd.: *See—*
Yamada, Takahiro; Kurahashi, Kazuyoshi; and Watanabe, Shyuji, 4,998,379, Cl. 49-138.000.
AT&E Corporation: *See—*
Suter, Richard R.; and Moen, Russell R., Jr., 4,999,516, Cl. 307-296.300.
AT&T Bell Laboratories: *See—*
Agazzi, Oscar E., 4,999,627, Cl. 341-131.000.
Agazzi, Oscar E., 4,999,830, Cl. 370-32.100.
Austin, Richard F.; Feldman, Robert D.; Sulhoff, James W.; and Zyskind, John L., 4,999,694, Cl. 357-30.000.
Blahut, Donald E.; Colbry, Brian W.; Lovett, Thomas D.; and LaMaster, Peter V., 4,999,808, Cl. 364-900.000.
Bonanni, Rocco; Parzygnat, William J.; and Weiss, Roger E., 4,998,796, Cl. 350-96.210.
Capasso, Federico; and Ralph, Stephen E., 4,999,485, Cl. 250-213.00A.
Capasso, Federico; Cho, Alfred Y.; and Sen, Susanta, 4,999,697, Cl. 357-34.000.
Chen, Hung-San; Farleigh, Scott E.; Helton, John S.; and Larson, Allen L., 4,999,832, Cl. 370-85.140.
Clemens, James T.; and Hong, Shane Y., 4,999,507, Cl. 250-492.200.
Fite, Franklin D., Jr.; and Sparrell, Duncan K., 4,999,829, Cl. 370-16.000.
Fontana, Edward C.; and Rucki, John S., 4,999,743, Cl. 361-400.000.
Henry, Charles H.; Kazarinov, Rudolf F.; and Shani, Yosi, 4,998,793, Cl. 350-96.150.
Huang, Kai-Feng; Jewell, Jack L.; McCall, Samuel L., Jr.; and Tai, Kuochou, 4,999,842, Cl. 372-45.000.
Johnston, Wilbur D., Jr.; Karlicek, Robert F., Jr.; Long, Judith A.; and Wilt, Daniel P., 4,999,315, Cl. 439-94.000.
Lu, Chih-Yuan; Sung, Janmye; and Wong, Yiu M., 4,999,317, Cl. 437-189.000.
Luryi, Sergey; and Pinto, Mark R., 4,999,687, Cl. 357-16.000.
Luryi, Sergey; and Xie, Ya-Hong, 4,999,843, Cl. 372-45.000.
Morgan, James V., Jr.; and Offord, Glen E., 4,999,529, Cl. 307-475.000.
Puri, Atul, 4,999,705, Cl. 358-136.000.
Atkins, Janice. Kaleidoscopes for viewing objects and method of reproducing viewed kaleidoscopic images. 4,998,789, Cl. 350-4.100.
Atkinson, Diane: *See—*
Drake, Donald J.; Campanelli, Michael R.; Burke, Cathie J.; and Atkinson, Diane, 4,999,077, Cl. 156-299.000.
Atlas Technology, Inc.: *See—*
Curl, Ricky L., 4,999,728, Cl. 361-33.000.
Atochem North America, Inc.: *See—*
Bohen, Joseph M.; Reifenberg, Gerald H.; and Stein, Daryl L., 4,999,391, Cl. 524-94.000.
Atsumi, Shigeru: *See—*
Ohtsuka, Nobuaki; Miyamoto, Junichi; and Atsumi, Shigeru, 4,999,813, Cl. 365-201.000.
Atsumi, Yoshinori: *See—*
Sugiyama, Kazuhiro; and Atsumi, Yoshinori, 4,999,460, Cl. 174-94.00R.
Atsuta, Shoji: *See—*
Kojima, Hiroaki; Ichiki, Toshio; Shibata, Shigehito; Harada, Takeshi; Hirano, Eiji; and Atsuta, Shoji, 4,999,147, Cl. 264-139.000.
Atterbury, Alan R.: *See—*
Balderson, Simon N.; and Atterbury, Alan R., 4,999,049, Cl. 75-234.000.
Atwood, John A., Jr. Electronic stimulating device. 4,998,913, Cl. 600-14.000.
Aubert, Guy, to Centre National de la Recherche Scientifique. Cylindrical permanent magnet to produce a transversal and uniform induction field. 4,999,600, Cl. 335-306.000.
Auger, Jean-Marc: *See—*
Autier, Philippe; Erman, Marko; and Auger, Jean-Marc, 4,999,686, Cl. 357-16.000.
Aura Systems, Inc.: *See—*
Stuart, Keith O., 4,998,441, Cl. 73-862.040.
Austin, Richard F.; Feldman, Robert D.; Sulhoff, James W.; and Zyskind, John L., to AT&T Bell Laboratories. Photodiode. 4,999,694, Cl. 357-30.000.
Autier, Philippe; Erman, Marko; and Auger, Jean-Marc, to U.S. Philips Corporation. Semiconductor device comprising an integrated optical guide, which has at least one rectilinear part and one curved part. 4,999,686, Cl. 357-16.000.
Automotive Products plc: *See—*
Nix, Richard A.; Branum, Leslie P.; Rei, Mark W.; and Schwartz, Michael L., 4,998,609, Cl. 192-109.00F.
Automotive Products (USA) Inc.: *See—*
Mabee, Brian, 4,998,444, Cl. 74-335.000.
Autopart Sweden AB: *See—*
Svensson, E. Gunnar, 4,999,746, Cl. 362-74.000.
Autry, Walter D., Jr.: *See—*
McCormick, Peter E.; and Autry, Walter D., Jr., 4,998,606, Cl. 192-56.00F.
Avant, Brian: *See—*
Calabra, Daniel; Hancock, Charles O.; and Avant, Brian, 4,999,165, Cl. 422-113.000.
Axelrod, Barry H.: *See—*
Baer, Patricia B.; Hunter, Kevin D.; Hart, William G.; Axelrod, Barry H.; and Sansone, Ronald P., 4,999,481, Cl. 235-375.000.
Axelsson, Lars B.: *See—*
Skanberg, Enar T.; and Axelsson, Lars B., 4,999,004, Cl. 297-480.000.
Aziende Chimiche Ruinite Angelini Francesco A. C. R. A. F. S. p. A.: *See—*
Baiocchi, Leandro; and Silvestrini, Bruno, 4,999,367, Cl. 514-403.000.
Azuma, Hiroshi; Takemura, Kenji; and Itoh, Kohji, to Omron Corporation. Linear pulse motor with magnetic armature lock. 4,999,530, Cl. 310-12.000.
Azumi, Takeshi; Morii, HIroshi; Naito, Yasuyuki; and Sakabe, Yukio, to Murata Manufacturing Co., Ltd. LC filter structure. 4,999,595, Cl. 333-184.000.
B. F. Goodrich Company, The: *See—*
Abraham, Tonson, 4,999,405, Cl. 525-338.000.
Sharaby, Zaev, 4,999,406, Cl. 525-386.000.
Baba, Fumiaki; and Oda, Jyujiro, to Mazda Motor Corporation. Duty solenoid valve control system for an automatic transmission. 4,998,449, Cl. 74-844.000.
Babcock, James W.: *See—*
Dzarnoski, John E., Jr.; and Babcock, James W., 4,999,311, Cl. 437-51.000.
Babel, Werner; and Schwarz, Walter, to Maho Aktiengesellschaft. Attachment tool for machine tools such as milling machines. 4,998,852, Cl. 409-144.000.

Bach, Stanley M., Jr.: *See—*
Bocchi, David E.; Laackman, Jeffrey T.; and Bach, Stanley M., Jr., 4,998,531, Cl. 128-419.00D.

Bachynsky, Maria O.; Infeld, Martin H.; Margolis, Richard J.; and Perla, Dennis A., to Hoffmann-La Roche Inc. Psoralen reagent compositions for extracorporeal treatment of blood. 4,999,375, Cl. 514-455.000.

Backholm, Philip G.: *See—*
Deschenes, Charles L.; Bourque, Donald L.; and Backholm, Philip G., 4,998,661, Cl. 227-67.000.

Baena, Juan A. M. Construction of buildings. 4,998,393, Cl. 52-236.900.

Baer, Patricia B.; Hunter, Kevin D.; Hart, William G.; Axelrod, Barry H.; and Sansone, Ronald P., to Pitney Bowes Inc. Method and apparatus for sequentially numbering mail pieces. 4,999,481, Cl. 235-375.000.

Bagno Robert G. Universal solar concentrator panel. 4,999,059, Cl. 136-248.000.

Bailey, Ray, to BASF Corporation. Apparatus and method of covering spandex yarn. 4,998,403, Cl. 57-18.000.

Bainbridge, David W.; and Olbert, William H., to Manville Corporation. Insulated exhaust pipe attachment means. 4,998,597, Cl. 181-243.000.

Baiocchi, Leandro; and Silvestrini, Bruno, to Aziende Chimiche Ruinite Angelini Francesco A. C. R. A. F. S. p. A. Ethers of 1-benzyl-3-hydroxymethyl-indazole with aliphatic 2-hydroxyacids, compositions and use. 4,999,367, Cl. 514-403.000.

Bair, Kenneth W., to Burroughs Wellcome Co. Tetracyclic heterocyclic derivatives, pharmaceutical compositions and use. 4,999,369, Cl. 514-410.000.

Baker Hughes Incorporated: *See—*
Brown, David P., 4,998,691, Cl. 248-74.100.

Baker International Corporation: *See—*
Hyll, John, 4,998,706, Cl. 249-184.000.

Balderson, Simon N.; and Atterbury, Alan R., to Thorn EMI plc. Thick film electrically resistive track material. 4,999,049, Cl. 75-234.000.

Baldinger, Verena: *See—*
Schmied, Bernhard; Lehmann, Hand D.; Baldinger, Verena; and Ruebsamen, Klaus, 4,999,345, Cl. 514-117.000.

Baldwin, Edward P.; and Todor, John S., Jr., to Adolph Coors Company. Apparatus and method for forming a plastic sheet. 4,999,152, Cl. 264-555.000.

Ball, Steven. Disposable pet litter box. 4,998,504, Cl. 119-168.000.

Balland, Patrick: *See—*
Wapler, Simone; and Balland, Patrick, 4,999,137, Cl. 252-516.000.

Ballinger, Bruce D.: *See—*
Haddock, Loren B.; Ballinger, Bruce D.; and Gelb, George H., 4,999,277, Cl. 430-269.000.

Balogun, Abdul-Razaq A.: *See—*
Gaiser, John W.; and Balogun, Abdul-Razaq A., 4,998,917, Cl. 604-96.000.

Baltes, Heinrich P.: *See—*
Ristic, Ljubisa; Baltes, Heinrich P.; and Smy, Thomas, 4,999,692, Cl. 357-27.000.

Balz, Michael A.: *See—*
Lutzke, Wayne S.; and Balz, Michael A., 4,998,399, Cl. 53-398.000.

Balzers Aktiengesellschaft: *See—*
Kunz, Anton, 4,999,458, Cl. 174-9.00R.

Banerjee, Sanjay K., to Texas Instruments Incorporated. Trench DRAM cell with dynamic gain. 4,999,811, Cl. 365-149.000.

Banquy, David L., to Foster Wheeler USA Corporation. Process for the production of synthesis gas. 4,999,133, Cl. 252-373.000.

Bares, Jan, to Xerox Corporation. Process control by creating and sensing half-tone test patches. 4,999,673, Cl. 355-208.000.

Barhydt, Dirck, Sr.; and Agresta, Frank J. Accessory faucet. 4,998,555, Cl. 137-359.000.

Barilla G.E.R. F.LLI - Societa per Azioni: *See—*
Guarneri, Roberto; and Ferrari, Claudio, 4,999,471, Cl. 219-10.55M.

Barker, Charles J.: *See—*
Meyer, Karen M.; Liggett, Michael D.; Conklin, Robert J.; and Barker, Charles J., 4,998,707, Cl. 251-129.150.

Barker, James M., to Halliburton Logging Services, Inc. Detonation transfer apparatus for initiating detonation of an insensitive detonating cord utilizing an initiating compound, flyer and shock reflector. 4,998,477, Cl. 102-275.600.

Barnett, O. Lynn. Rotating fishing lure spreader for use while trolling. 4,998,374, Cl. 43-42.740.

Barnett, Stanley M.; Lausier, Joan M.; and Montalto, Samuel J., to Board of Governors for Higher Education, State of Rhode Island and Providence Plantations, The. Polyaphrons as a drug delivery system. 4,999,198, Cl. 424-449.000.

Barr, William A. Alarm system for vehicle automatic transmission. 4,999,605, Cl. 340-456.000.

Barrett, Anthony P.: *See—*
Su, Wei-Fang A.; Barrett, Anthony P.; Scala, Luciano C.; and Schoch, Karl F., Jr., 4,999,136, Cl. 252-512.000.

Barsomian, Janet M.; and Wilson, Geoffrey G., to New England Biolabs, Inc. Method for producing the HhaI restriction endonuclease and methylase. 4,999,293, Cl. 435-172.300.

Barteaux, Peter C. Bag holder. 4,998,694, Cl. 248-100.000.

Bartell, Robert J., to Magnetek Universal Electric. Strain relief and support for electric motor wiring. 4,999,532, Cl. 310-71.000.

Barth, John E., Jr.; Drake, Charles E.; Hovis, William P.; Kalter, Howard L.; Kelley, Gordon A., Jr.; Lewis, Scott C.; Nickel, Daniel J.; and Yankosky, James A., to International Business Machines Corporation. Low power addressing systems. 4,999,815, Cl. 365-230.060.

Bartkowiak, John G.: *See—*
Asghar, Safdar M.; and Bartkowiak, John G., 4,999,626, Cl. 341-126.000.

Barton, Billy J.: *See—*
Biermacher, Richard F.; Tallon, Thomas G.; Black, Dwayne A.; and Barton, Billy J., 4,998,766, Cl. 296-136.000.

Barton, Marlene R., to University of Minnesota, Regents of the. Bacterial degradation of 4-chlorobiphenyl. 4,999,300, Cl. 435-252.340.

BASF Aktiengesellschaft: *See—*
Albert, Bernhard; Etzbach, Karl-Heinz; and Sens, Ruediger, 4,999,026, Cl. 8-471.000.
Bertleff, Werner; Koeffer, Dieter; Klaeui, Wolfgang; and Song, Choong-Eui, 4,999,443, Cl. 556-136.000.
Dobler, Walter; Paust, Joachim; and Betz, Roland, 4,999,437, Cl. 549-222.000.
Dobuler, Walter; Schul, Wolfgang; Paust, Joachim; and Mitschker, Alfred, 4,999,112, Cl. 210-656.000.
Gerhardt, Wolfgang; and Hefner, Werner, 4,999,031, Cl. 55-43.000.
Grossmann, Klaus; Walter, Helmut; and Wuerzer, Bruno, 4,999,041, Cl. 71-70.000.
Liedek, Egon; and Haegele, Gerhard, 4,999,134, Cl. 252-389.510.
Merger, Franz; Horler, Hans; Hoelderich, Wolfgang; and Witzel, Tom, 4,999,453, Cl. 560-211.000.
Rehmer, Gerd; Schwartz, Manfred; and Dotzauer, Bernhard, 4,999,218, Cl. 427-54.100.
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,999,044, Cl. 71-92.000.
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Gerhard, Paul; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,999,045, Cl. 71-92.000.
Schmied, Bernhard; Lehmann, Hand D.; Baldinger, Verena; and Ruebsamen, Klaus, 4,999,345, Cl. 514-117.000.

BASF Corporation: *See—*
Bailey, Ray, 4,998,403, Cl. 57-18.000.

Bashir, Irfan. Applicator for nail polish remover. 4,998,839, Cl. 401-208.000.

Bass, Ronald M., to APTI, Inc. Creation of artificial ionization clouds above the earth. 4,999,637, Cl. 342-367.000.

Basta, Walter. Telescopic rifle sight with automatic setting of the elevation by an electromotor. 4,998,811, Cl. 350-560.000.

Baumard, Jean-Francois; Dubois, Bertrand; and Odier, Philippe, to Rhone-Poulenc Chimie. Stabilized zirconia powders. 4,999,182, Cl. 423-608.000.

Baumel, Stanley J. Apparatus and method for fatigue testing a wheel. 4,998,440, Cl. 73-810.000.

Baumgarth, Arnold E. Anti-clog caps for rain gutters and the like. 4,998,386, Cl. 52-16.000.

Baxter International Inc.: *See—*
Oakley, Robert V., 4,999,307, Cl. 436-180.000.

Bay Industrial & Mine Tech Inc.: *See—*
MacKenzie, Robert, 4,999,753, Cl. 362-234.000.

Bayer Aktiengesellschaft: *See—*
Genz, Joachim; Tresper, Erhard; Idel, Karsten-Josef; Bottenbruch, Ludwig; and Eckhardt, Volker, 4,999,414, Cl. 528-125.000.
Holmwood, Graham; Kraatz, Udo; Buchel, Karl H.; Brandes, Wilhelm; Dutzmann, Stefan; and Reinecke, Paul, 4,999,440, Cl. 549-556.000.
Leitz, Edgar; Bottenbruch, Ludwig; Ott, Karl-Heinz; Jung, Alfred; and Grigo, Ulrich, 4,999,420, Cl. 528-371.000.

Bayer, Dean M.; Harris, Curtis H.; and Jones, Bradley A., to General Motors Corporation. Reinforced impact bar for a bumper assembly. 4,998,761, Cl. 293-121.000.

Bayern-chemie Gesellschaft fuer Flugchemisch Antriebe mbH: *See—*
Werner, Bernd; and Voggenreiter, Harald, 4,998,750, Cl. 280-740.000.

Baylor College of Medicine: *See—*
Kit, Malon; and Kit, Saul, 4,999,296, Cl. 435-235.100.
Lacy, Jeffrey L., 4,999,501, Cl. 050-385.100.

Beach, John R.: *See—*
Hasan, Syed R.; and Beach, John R., 4,998,662, Cl. 227-111.000.

Beach, Wayne H.; and Shick, Steven D., to Kennametal Inc. Cutting bit and block mount. 4,998,574, Cl. 144-241.000.

Beaman, Brian S., to International Business Machines Corporation. Elastomeric area array interposer. 4,998,885, Cl. 439-66.000.

Beard, Susan E.: *See—*
Erb, George H.; and Beard, Susan E., 4,999,067, Cl. 156-73.100.

Bechtel, James H.: *See—*
Salour, Michael M.; and Bechtel, James H., 4,998,803, Cl. 350-321.000.

Beck, Charles E. J.: *See—*
Sprecker, Mark A.; Belko, Robert P.; Hanna, Marie R.; Beck, Charles E. J.; and Brucato, Salvatore M., 4,999,439, Cl. 549-397.000.

Beck, Heinz: *See—*
Kuhne, Helmut; Frassek, Karl-Heinz; Sonderhof, Dieter; Lanzrath, Gunther; Steinseifer, Fritz; and Beck, Heinz, 4,999,400, Cl. 525-196.000.

Beck, Michael W., to Imperial Chemical Industries plc. Connection device for blasting signal transmission tubing. 4,998,478, Cl. 102-275.700.

Becker, Rolf: *See—*
Lueth, Gero; Becker, Rolf; Horn, Robert K.; Kempe, Uwe; and Vodrazka, Wolfgang, 4,999,029, Cl. 48-197.00R.

Beckley, Guy B.: *See*—
Ralph, John T.; Beckley, Guy B.; Brady, Frank T.; Jelenek, Ivan; Korn, Darryl K.; Meyer, John; Nay, Daniel L.; Searle, Colin M.; Shick, David; Williams, Richard W.; and Wilson, Jon C., deceased, 4,999,771, Cl. 364-200.000.

Becton, Dickinson and Company: *See*—
Alchas, Paul G., 4,998,926, Cl. 604-251.000.
Jaeger, Thomas; and Wasek, Raymond T., 4,999,303, Cl. 435-300.000.
Solomon, Donald D.; and Byron, M. Parke, 4,999,210, Cl. 427-2.000.

Beha, Johannes G.; Blacha, Armin U.; Clauberg, Rolf; and Seitz, Hugo K., to International Business Machines Corporation. Method for contactless testing of conducting paths in a substrate using photon-assisted tunneling. 4,999,577, Cl. 324-158.00R.

Behrens, Mark B., to INA Bearing Company. Method of making a unitary, axially self-locating needle bearing. 4,998,346, Cl. 29-898.610.

Belanger, Jacques F. Adjustable fulcrum for hammers. 4,998,996, Cl. 254-26.00E.

Belko, Robert P.: *See*—
Sprecker, Mark A.; Belko, Robert P.; Hanna, Marie R.; Beck, Charles E. J.; and Brucato, Salvatore M., 4,999,439, Cl. 549-397.000.

Bell, Joel. Blockage alert and purge system. 4,998,412, Cl. 62-126.000.

Bellino, Joseph P.; Arnold, David; O'Brien, Dexter T.; and Goldman, Ira B., to General Electric Company. Molded case circuit breaker contact and contact arm arrangement. 4,999,464, Cl. 200-267.000.

Beltchev, Beltcho A., to Bulgarska Industrialna Stopanska Associatia. Method for dewatering and drying a liquid/solid slurry and an apparatus for using the method. 4,999,118, Cl. 210-771.000.

Belz, Klaus: *See*—
Koch, Paul; and Belz, Klaus, 4,999,108, Cl. 210-243.000.

Bender, Arne. Device for chopping straw. 4,998,679, Cl. 241-243.000.

Bender, David K.; and Lathrop, Richard R., Jr., to Northern Telecom Limited. Surge protector for telecommunications systems. 4,999,731, Cl. 361-119.000.

Benkan Corporation: *See*—
Matsumoto, Shigeyuki; and Kawamura, Tomoyoshi, 4,998,754, Cl. 285-150.000.

Benkovic, Stephen J.; Blatchly, Richard A.; and Inglese, James, to Pennsylvania State University, The. GAR transformylase inhibitor. 4,999,424, Cl. 536-22.000.

Benton, Bradley K.: *See*—
Gibson, Owen E.; Gleeson, William J.; Burkholder, Larry D.; and Benton, Bradley K., 4,998,664, Cl. 228-102.000.

Bentsen, Aksel T., to Novopan Traeindustri A/S. Composite board and a method and a composition for its production. 4,999,390, Cl. 524-30.000.

Berg, John R.: *See*—
Wells, Gregory J.; and Berg, John R., 4,999,162, Cl. 422-54.000.

Berger, Manfred; Spielmann, Daniele; and Traitler, Helmut, to Nestec S.A. Treatment of liporotein disorders associated with cholesterol metabolism. 4,999,380, Cl. 514-558.000.

Bergeron, Raymond E. Power bucket. 4,998,762, Cl. 294-68.230.

Berghaus, Rainer: *See*—
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,999,044, Cl. 71-92.000.
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Gerhard, Paul; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,999,045, Cl. 71-92.000.

Bergmin, Renzo; Quittmann, Wilhelm; and Stoffel, Josef, to Lonza Ltd. Process for the reduction of the polymer portion in the dimerization of ketene. 4,999,438, Cl. 549-329.000.

Bergvik Kemi AB: *See*—
Canestri, Giuseppe, 4,999,132, Cl. 252-356.000.

Bernhard, Dieter: *See*—
Raab, Harald; Ament, Norbert; and Bernhard, Dieter, 4,998,608, Cl. 192-106.200.

Bernstein, Gerald. Needle adaptor for an electrosurgical tool. 4,998,934, Cl. 606-44.000.

Bertleff, Werner; Koeffer, Dieter; Klaeui, Wolfgang; and Song, Choong-Eui, to BASF Aktiengesellschaft. Transition metal complexes. 4,999,443, Cl. 556-136.000.

Best Lock Corporation: *See*—
Borgmann, James W.; and Foshee, William R., deceased, 4,998,422, Cl. 70-38.00A.
Nixon, Duane B.; Palmer, Ralph P.; and Pritchett, Carl M., 4,998,760, Cl. 292-347.000.

Betz, Roland: *See*—
Dobler, Walter; Paust, Joachim; and Betz, Roland, 4,999,437, Cl. 549-222.000.

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Precht, Hans J.; Beumer, Klaus; and Scholz, Bernd, 4,998,463, Cl. 99-300.000.

Bevan, Christopher G., to C. G. Bevan Associates Limited. Apparatus and method for introducing reinforcement into a mold. 4,999,150, Cl. 264-257.000.

BeVan, Erik T., to Honeywell Inc. Fixed curved path waypoint transition for aircraft. 4,999,782, Cl. 364-448.000.

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Bhatt, Surendra J., to General Dynamics Corporation. Method of inspecting solder joints with a laser inspection system. 4,999,499, Cl. 250-342.000.

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Perovetz, Lawrence M.; and Bhattacharya, Nagendra N., 4,999,054, Cl. 106-1.230.

Biber, Klaus: *See*—
Sander, Ulrich; and Biber, Klaus, 4,998,810, Cl. 350-528.000.

Bickford, Dale M.; Farnsworth, Richard G.; Hardy, Samuel G.; Hawley, John R.; and Varney, Albert R., Jr., to General Electric Company. Redundant pulse monitoring in electric energy metering system. 4,999,572, Cl. 342-103.00R.

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Pollen, Rudy W. J.; and Bierhoff, Martinus P. M., 4,999,828, Cl. 369-59.000.

Biermacher, Richard F.; Tallon, Thomas G.; Black, Dwayne A.; and Barton, Billy J., to Chrysler Corporation. Convertible top boot attaching arrangement. 4,998,766, Cl. 296-136.000.

Biermann, Kurt: *See*—
Goebbels, Hans R.; Biermann, Kurt; Steppat, Gerhard; Stapel, Wilhelm; Rosemann, Michael; and Seiler, Klaus D., 4,998,490, Cl. 112-231.000.

Bingham, David; and Allen, Charles M., to Maxim Integrated Products. Integrated dual charge pump power supply and RS-232 transmitter/-receiver. 4,999,761, Cl. 363-60.000.

Biogen, N.V.: *See*—
Galliher, Parrish M., 4,999,422, Cl. 530-351.000.

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Brufani, Mario; Ceccarelli, Stefano; Giannetti, Patrizia; Paesano, Agnese; Scuri, Romolo; and Zanarella, Sergio, 4,999,350, Cl. 514-210.000.

Biotronics Enterprises, Inc.: *See*—
Evans, Wayne W., 4,999,607, Cl. 340-533.000.

Birger, Ari, to Motorola, Inc. Floating point adder with pre-shifter. 4,999,800, Cl. 364-748.000.

Birke, James L.: *See*—
Roberts, Bradley M.; and Birke, James L., 4,998,943, Cl. 29-432.200.

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Kessing, Reinhard; and Schroder, Friedrich, 4,998,869, Cl. 425-81.100.

Bjorksund, Margareta; and Widlund, Urban, to Molnlycke AB. Disposable diaper. 4,998,929, Cl. 604-385.200.

Blacha, Armin U.: *See*—
Beha, Johannes G.; Blacha, Armin U.; Clauberg, Rolf; and Seitz, Hugo K., 4,999,577, Cl. 324-158.00R.

Black & Decker Inc.: *See*—
Chaconas, Peter C.; and Stone, Paul A., 4,998,454, Cl. 81-460.000.

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Biermacher, Richard F.; Tallon, Thomas G.; Black, Dwayne A.; and Barton, Billy J., 4,998,766, Cl. 296-136.000.

Black, Gregg T.; and Goulart, Joseph F., to Chrysler Corporation. Manifold mounted air pump. 4,998,524, Cl. 123-559.100.

Blackburn, Bruce N., to Weinstein, Bernard. Dial face for clock or watch. 4,999,822, Cl. 368-228.000.

Blackwell, George L., III, to MindGames, Inc. Board game. 4,998,735, Cl. 273-249.000.

Blahut, Donald E.; Colbry, Brian W.; Lovett, Thomas D.; and LaMaster, Peter V., to AT&T Bell Laboratories. Dual byte order data processor. 4,999,808, Cl. 364-900.000.

Blair, Curt N.: *See*—
Stumpf, David K.; and Blair, Curt N., 4,998,433, Cl. 73-25.010.

Blankenship, Lowel E., to Universal Data Systems, Inc. Ejector mechanism. 4,999,744, Cl. 361-415.000.

Blase, Richard A. Firearm cleaning device and method. 4,998,368, Cl. 42-95.000.

Blatchly, Richard A.: *See*—
Benkovic, Stephen J.; Blatchly, Richard A.; and Inglese, James, 4,999,424, Cl. 536-22.000.

Blatt, John A. Rodless fluid actuated motor with improved sealing characteristics. 4,998,459, Cl. 92-88.000.

Blount, David H. Process for the production of flame-retardant polyurethane products. 4,999,383, Cl. 521-103.000.

Blue, Barry M.; and Blue, James P. Overfill valve apparatus. 4,998,571, Cl. 141-198.000.

Blue, James P.: *See*—
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Blum, Kurt E. Cartridge and magazine apparatus for storage and automatic feed of screw fasteners. 4,998,452, Cl. 81-57.370.

Blythe, Alan A., to British Aerospace Public Limited Company. Aircraft of split turbo-prop configuration. 4,998,995, Cl. 244-55.000.

Board of Governors for Higher Education, State of Rhode Island and Providence Plantations, The: *See*—
Barnett, Stanley M.; Lausier, Joan M.; and Montalto, Samuel J., 4,999,198, Cl. 424-449.000.
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Board of Regents, The University of Texas System: *See*—
Anaissie, Elias J.; Samonis, Georgios; Krause, Hans; and Bodey, Gerald P., 4,999,199, Cl. 424-450.000.
Hoffman, Wayne L.; and Jump, Adrien A., 4,999,340, Cl. 514-23.000.
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Bocchi, David E.; Laackman, Jeffrey T.; and Bach, Stanley M., Jr., to Cardiac Pacemakers, Inc. Implantable N-phasic defibrillator output bridge circuit. 4,998,531, Cl. 128-419.00D.

Bock, Georg: *See—*
John, Thomas; Bock, Georg; Burger, Rainer; and Gollinger, Franz X., 4,998,475, Cl. 101-366.000.

Bockewitz, Leland. Suspension for smooth ride with good handling control of heavy load vehicles. 4,998,749, Cl. 280-712.000.

Bocquet, Jean-Pierre; and Vieau, Daniel, to SKID, societe anonyme. Method and device for coating ski soles. 4,999,224, Cl. 427-356.000.

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Semler, Gerd; and Wilhelm, Gerd, 4,999,491, Cl. 250-236.000.

Bodey, Gerald P.: *See—*
Anaissie, Elias J.; Samonis, Georgios; Krause, Hans; and Bodey, Gerald P., 4,999,199, Cl. 424-450.000.

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Gandolfi, Carmelo A.; Frigerio, Marco; Spinelli, Silvano; Tofanetti, Odoardo; and Tognella, Sergio, 4,999,362, Cl. 514-334.000.

Boehringer Mannheim Corp.: *See—*
Parks, Robert A.; and White, Bradley E., 4,999,582, Cl. 324-438.000.
Parks, Robert A., 4,999,632, Cl. 341-167.000.

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Tsaklakidis, Christos; Leinert, Herbert; and Freund, Peter, 4,999,361, Cl. 514-333.000.

Boeing Company, The: *See—*
Curtis, R. Eugene; Narayanan, G. Hari; and Quist, William E., 4,999,061, Cl. 148-12.70A.
Falk, R. Aaron, 4,999,486, Cl. 250-213.00A.
Huggins, Raymond W., 4,999,489, Cl. 250-226.000.
Mitchell, James E., 4,999,780, Cl. 364-428.000.

Boerstler, David W.; and Stigliani, Daniel J., Jr., to International Business Machines Corporation. Fiber optic mode conditioner. 4,998,792, Cl. 350-96.150.

Bogart, John D. Decontamination apparatus mobile water. 4,999,103, Cl. 210-151.000.

Bogatyrev, Vladimir J.: *See—*
Kuchuk-Yatsenko, Sergei I.; Krivenko, Valery G.; Kuznetsov, Petr V.; Bogatyrev, Vladimir J.; Golovchenko, Sergei I.; and Ignatenko, Vadim J., 4,999,476, Cl. 219-97.000.

Bohen, Joseph M.; Reifenberg, Gerald H.; and Stein, Daryl L., to Atochem North America, Inc. Halogen substituted phthalimide flame retardants. 4,999,391, Cl. 524-94.000.

Boich, Heinz-H., to Corovin GmbH. Apparatus for producing a non-woven fabric from continuous filaments. 4,999,080, Cl. 156-441.000.

Bolan, Michael L.: *See—*
Link, Joseph; Bolan, Michael L.; Brunk, Allen H., Jr.; and Schneikart, Paul E., 4,998,888, Cl. 439-73.000.

Bolli, Peter; and Tanner, Werner, to Interlego A.G. Toy actuation system. 4,998,903, Cl. 446-102.000.

Bonanni, Rocco; Parzygnat, William J.; and Weiss, Roger E., to AT&T Bell Laboratories. Method of assembling multi-grooved silicon chip fiber optic terminations. 4,998,796, Cl. 350-96.210.

Bonnell, Ralph E.; Castello, George C.; and Hoebener, Karl G., to International Business Machines Corporation. Method of attaching electronic components. 4,998,342, Cl. 29-840.000.

Bonnit Brush Systems Co.: *See—*
Borofsky, Gary R., 4,998,314, Cl. 15-4.000.

Bordaz, Pascal; Giraud, Laurent; Monnier, Alain; and Prus, Eric, to Sames S.A. Manually controlled spraying installation and sprayer. 4,998,672, Cl. 239-585.000.

Borg, Donald M. Workpiece holder and method of installing a vehicle windshield therewith. 4,998,711, Cl. 269-21.000.

Borgions, Willem J., to U.S. Philips Corporation. Storage case for optical discs. 4,998,618, Cl. 206-307.000.

Borgmann, James W.; and Foshee, William R., deceased (by Foshee, Carolyn S., executrix), to Best Lock Corporation. Removable core padlock with bolt retainer. 4,998,422, Cl. 70-38.00A.

Borofsky, Gary R., to Bonnit Brush Systems Co. Combination of a bonnet and a base member for a rotary cleaning machine. 4,998,314, Cl. 15-4.000.

Boros, Leslie A. Convertible footwear. 4,998,329, Cl. 24-662.000.

Borzatta, Valerio: *See—*
Cantatore, Giuseppe; and Borzatta, Valerio, 4,999,392, Cl. 524-99.000.

Bos, John H.: *See—*
Bos, William J.; and Bos, John H., 4,998,495, Cl. 114-218.000.

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Kehl, Georg; Siegel Heinz; Deringer, Helmut; Rischen, Dietmar; Abbing, Andreas; and Bullinger, Alfred, 4,998,781, Cl. 303-10.000.

Bose, Tapan K.; Chahine, Richard; and St-Arnaud, Jean-Marie, to Universite du Quebec a Trois-Rivieres; Societe Quebecoise d'Initiatives Petrolieres; and Gas Metropolitain Inc. High-density adsorbent and method of producing same. 4,999,330, Cl. 502-402.000.

Bossi, Donald E.: *See—*
Goodhue, William D.; Rediker, Robert H.; and Bossi, Donald E., 4,999,316, Cl. 437-129.000.

Bostik, Inc.: *See—*
Gilch, Heinz G.; and Albert, Karl-Heinz, 4,999,407, Cl. 525-457.000.

Bottenbruch, Ludwig: *See—*
Genz, Joachim; Tresper, Erhard; Idel, Karsten-Josef; Bottenbruch, Ludwig; and Eckhardt, Volker, 4,999,414, Cl. 528-125.000.
Leitz, Edgar; Bottenbruch, Ludwig; Ott, Karl-Heinz; Jung, Alfred; and Grigo, Ulrich, 4,999,420, Cl. 528-371.000.

Bouchard, William L.; Cummings, Robert E.; Kalinowski, Paul W.; and Sudol, Charles W., to Norton Company. Grinding wheel mounting means. 4,998,384, Cl. 51-168.000.

Boudakian, Max M.; and Fidler, Delmer A., to Olin Corporation. Process for low chloride 1,2,4-triazol-5-one. 4,999,434, Cl. 548-263.200.

Bouldin, Eric W., to Drexler Technology Corporation. Transmissively read optical recording medium. 4,999,278, Cl. 430-270.000.

Boulton, James B.: *See—*
Fox, Alfred E.; and Boulton, James B., 4,998,586, Cl. 168-12.000.

Bourcier, Henri; and Doittau, Francois X., to U.S. Philips Corp. Picture analyser tube with streak compensation. 4,999,548, Cl. 315-370.000.

Bourque, Donald L.: *See—*
Deschenes, Charles L.; Bourque, Donald L.; and Backholm, Philip G., 4,998,661, Cl. 227-67.000.

Bowen, John H. Golf putting and swing aid for practice. 4,998,731, Cl. 273-183.00B.

Bowen, Terry P.; Reitz, Paul R.; and Long, William K., to AMP Incorporated. Reflection-less terminator. 4,998,795, Cl. 350-96.200.

Bowers, Gregory S., to Southern Water Treatment Company, Inc. Waste water treatment method. 4,999,116, Cl. 210-709.000.

Bowers, William W.; Lieb, M. Jeremy; and Shockey, Robert J., to Outboard Marine Corporation. Engine maintenance fluid introduction system. 4,998,969, Cl. 123-187.50R.

Bowman, Bruce R.; Oran, Michael R.; and Syring, Gary J., to Eden Tec Corporation. Sleep screening system with time based modulated data. 4,999,772, Cl. 364-413.050.

Bowman, Melvin G. Thermochemical cycle for splitting hydrogen sulfide. 4,999,178, Cl. 423-571.000.

Box, Thomas, to Spectrum International, Inc. Poultry drawer. 4,998,967, Cl. 119-22.000.

Boyle, Francis T.; and Matusiak, Zbigniew S., to Imperial Chemical Industries PLC. Azole derivatives. 4,999,364, Cl. 514-340.000.

Braatz, James A.: *See—*
Wolfe, Richard A.; Heifetz, Aaron H.; Braatz, James A.; and Donofrio, David M., 4,999,298, Cl. 435-240.242.

Brackett, Tom S.; and Webster, Milo E., to Integrated Fluidics, Inc. Method of bonding plastics. 4,999,069, Cl. 156-84.000.

Bradley, Edward C.: *See—*
Paradise, Carolyn M.; and Bradley, Edward C., 4,999,339, Cl. 514-2.000.

Bradt, Howard J.: *See—*
Stocco, Joseph A.; and Bradt, Howard J., 4,999,020, Cl. 417-222.000.

Brady, Frank T.: *See—*
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Braeutigam, Max: *See—*
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Bran, Mario E., to Verteq, Inc. Megasonic cleaning apparatus. 4,998,549, Cl. 134-184.000.

Brand, Hans-Wolfgang: *See—*
Klee, Mareike K.; and Brand, Hans-Wolfgang, 4,999,181, Cl. 423-608.000.

Brand, Peter, to Korber AG. Method of and apparatus for eliminating irregularities from a stream of fibrous material. 4,998,540, Cl. 131-110.000.

Brandes, Wilhelm: *See—*
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Branum, Leslie P.: *See—*
Nix, Richard A.; Branum, Leslie P.; Rei, Mark W.; and Schwartz, Michael L., 4,998,609, Cl. 192-109.00F.

Braswell, Odell W. Double hook lure. 4,998,373, Cl. 43-42.370.

Braun, Bernd: *See—*
Schilling, Jurgen; Reichmann, Horst; Henche, Wolfgang; Pieper, Thomas; Braun, Bernd; and Ludowisy, Hans, 4,998,877, Cl. 431-19.000.

Braun, Ernst: *See—*
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Braun, Hilarion, to Eastman Kodak Company. Bubble jet print head having improved multiplex actuation construction. 4,999,650, Cl. 346-140.00R.

Braunlich, Peter F.; Tetzlaff, Wolfgang; Hegland, Joel E.; and Jones, Scott C., to International Sensor Technology, Inc. Remote radiation dosimetry. 4,999,504, Cl. 250-484.100.

Brazdrum, Helmut; and Koch, Rudolf, to Siemens Aktiengesellschaft. Integratable switched-capacitor sigma-delta modulator. 4,999,634, Cl. 341-172.000.

Breskin, Amos; and Chechik, Rachel, to Yeda Research & Development Co., Ltd. Apparatus for radiographic imaging. 4,999,500, Cl. 250-385.100.

Bresko, Joseph R. Holder for maintaining electrical connections. 4,998,891, Cl. 439-369.000.

Bridgeford, Douglas J., to Teepak, Inc. Cellulose aminomethanate by ion-exchange extraction. 4,999,425, Cl. 536-30.000.

Bridges, Ronald L.: *See—*
Fina, Louis R.; Lambert, Jack L.; and Bridges, Ronald L., 4,999,190, Cl. 424-79.000.

Brinkley, Christie. Educational toy. 4,998,883, Cl. 434-159.000.

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British Aerospace Public Limited Company: *See—*
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Williams, Anthony B.; Redford, Kenneth M.; Mitchell, Scott; and Bussell, Richard N., 4,999,524, Cl. 307-54.000.

British United Shoe Machinery Ltd.: *See—*
Mellors, Harry; and Johnson, Susan G., 4,999,237, Cl. 428-280.000.

Broeze, Robert J.; and Vovis, Gerald F., to Collaborative Research, Inc. Two-chain urokinase plasminogen activators for treatment of thrombotic disease. 4,999,194, Cl. 424-94.630.

Bron, Dan. Drip emitter. 4,998,556, Cl. 137-501.000.

Brother International Corporation: *See—*
Lee, Hee K., 4,998,360, Cl. 38-36.000.

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Kuwabara, Satoru; Izaki, Takeshi; Sakakibara, Kenji; and Kobayashi, Masanari, 4,999,666, Cl. 355-27.000.
Okimoto, Satoshi; Fujikawa, Yukiharu; Otsuka, Naoki; and Sato, Miyuki, 4,998,832, Cl. 400-76.000.
Tanaka, Takafumi, 4,998,493, Cl. 112-453.000.
Yamamoto, Takemi; and Higashiyama, Shunichi, 4,999,331, Cl. 503-200.000.

Brotz, Gregory R. Metalized fiber/member structures and methods of producing same. 4,999,240, Cl. 428-288.000.

Brown, David P., to Baker Hughes Incorporated. U-shaped pipe clamping system. 4,998,691, Cl. 248-74.100.

Brown, Dennis L. Stereoscope. 4,998,799, Cl. 350-133.000.

Brown, Gary L.: *See—*
Knierim, David L.; and Brown, Gary L., 4,999,702, Cl. 358-32.000.

Brown, Gordon T.; and Stewart, David A. Gantry robot construction and drive mechanism. 4,998,442, Cl. 74-89.170.

Brown, Neil, to Vereinigte Aluminum-Werke Aktiendesellschaft. Method for removing sodium oxalate from caustic aluminate liquors. 4,999,170, Cl. 423-112.000.

Browning, Joseph B. Tangle free leash apparatus. 4,998,507, Cl. 119-109.000.

Brubaker, Clifford E.: *See—*
Silverman, Michael W.; Heinrich, Michael; Brubaker, Clifford E.; and McLaurin, Colin A., 4,998,354, Cl. 33-514.200.

Brucato, Salvatore M.: *See—*
Sprecker, Mark A.; Belko, Robert P.; Hanna, Marie R.; Beck, Charles E. J.; and Brucato, Salvatore M., 4,999,439, Cl. 549-397.000.

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Brunck, Terence K.; Larocca, David J.; and Monahan, John J., to Triton Biosciences Inc. HTLV-I anti-sense RNA and encoded proteins. 4,999,421, Cl. 530-350.000.

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Link, Joseph; Bolan, Michael L.; Brunk, Allen H., Jr.; and Schneikart, Paul E., 4,998,888, Cl. 439-73.000.

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Bry-Air, Inc.: *See—*
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Bryan-Jones, David G., to 501 United Distillers plc. Culture and preservation of microorganisms within a concentrated medium. 4,999,301, Cl. 435-252.500.

Bryan, Robert M. Composite tray and stacker for a shrink wrapped package. 4,998,615, Cl. 206-44.120.

Bryant, Robert S., to Eastman Kodak Company. Method and apparatus for indicating an operating condition of a camera prior to use. 4,999,662, Cl. 354-412.000.

Buchanan, Bradley H., to Float Machines Inc. Cutting and heat sealing die assembly. 4,999,081, Cl. 156-515.000.

Buchel, Karl H.: *See—*
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Buckholz, Lawrence, Jr.; Farbood, Mohamad I.; Kossiakoff, Nicolas; and Scharpf, Lewis G., to International Flavors & Fragrances Inc. Use of sclareolide in augmenting or enhancing the organoleptic properties of foodstuffs. 4,999,207, Cl. 426-536.000.

Budnick, John. Accessory for golfers. 4,998,726, Cl. 273-32.00A.

Buell Industries, Inc.: *See—*
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Buethe, Kenneth W.: *See—*
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Bulgarska Industrialna Stopanska Associatia: *See—*
Beltchev, Beltcho A., 4,999,118, Cl. 210-771.000.

Bulgin, Edward G.: *See—*
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Bull HN Information Systems Inc.: *See—*
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Bullinger, Alfred: *See—*
Kehl, Georg; Siegel Heinz; Deringer, Helmut; Rischen, Dietmar; Abbing, Andreas; and Bullinger, Alfred, 4,998,781, Cl. 303-10.000.

Bunning, Donald L.; Etzkorn, William G.; Haydon, William M.; Harkreader, Gordon G.; Kurland, Jonathan J.; Liu, Wai C.; and Vera-Castaneda, Ernesto, to Union Carbide Chemicals and Plastics Company Inc. Process for producing acrylic ester. 4,999,452, Cl. 560-208.000.

Burger, Rainer: *See—*
John, Thomas; Bock, Georg; Burger, Rainer; and Gollinger, Franz X., 4,998,475, Cl. 101-366.000.

Burke, Cathie J.: *See—*
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Burkholder, Larry D.: *See—*
Gibson, Owen E.; Gleeson, William J.; Burkholder, Larry D.; and Benton, Bradley K., 4,998,664, Cl. 228-102.000.

Burkholder, Robert F.: *See—*
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Burr-Brown Corporation: *See—*
Burt, Rodney T.; Kalthoff, Timothy V.; Heisley, David A.; and Stitt, R. Mark, II, 4,999,585, Cl. 332-149.000.

Burr, William J., to Union Carbide Industrial Gases Technology Corporation. Isokinetic probe and pressure reduction assembly. 4,998,954, Cl. 73-863.580.

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Bair, Kenneth W., 4,999,369, Cl. 514-410.000.

Burt, Rodney T.; Kalthoff, Timothy V.; Heisley, David A.; and Stitt, R. Mark, II, to Burr-Brown Corporation. Circuit technique for canceling non-linear capacitor-induced harmonic distortion. 4,999,585, Cl. 332-149.000.

Busch, Francis, Jr.: *See—*
Ladd, James E., Jr.; and Busch, Francis, Jr., 4,998,617, Cl. 206-219.000.

Bushey, Roger A.; and Ferree, Stanley E., to Alloy Rods Global, Inc. Metal cored electrode. 4,999,478, Cl. 219-137.0WM.

Bussell, Richard N.: *See—*
Williams, Anthony B.; Redford, Kenneth M.; Mitchell, Scott; and Bussell, Richard N., 4,999,524, Cl. 307-54.000.

Butler, Peter: *See—*
Doroszkowski, Andrew; Toynton, Michael A.; and Butler, Peter, 4,999,091, Cl. 204-14.100.

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Buynoski, Matthew S., to National Semiconductor Corporation. Aluminum-implant leakage reduction. 4,999,309, Cl. 437-15.000.

Byron, M. Parke: *See—*
Solomon, Donald D.; and Byron, M. Parke, 4,999,210, Cl. 427-2.000.

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Bevan, Christopher G., 4,999,150, Cl. 264-257.000.

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Wheadon, Ellis G.; and Forrer, Larry L., 4,998,340, Cl. 29-623.100.

Calabra, Daniel; Hancock, Charles O.; and Avant, Brian, to MDT Corporation. Pressure vessel with improved gasket valve. 4,999,165, Cl. 422-113.000.

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Witzel, Bruce E.; Allison, Debra L.; Caldwell, Charles G.; and Rupprecht, Kathleen, 4,999,436, Cl. 549-45.000.

Califf, Robert M.: *See—*
Selker, Harry P.; Wagner, Galen S.; Weaver, W. Douglas; and Califf, Robert M., 4,998,535, Cl. 128-696.000.

Campanelli, Michael R.: *See—*
Drake, Donald J.; Campanelli, Michael R.; Burke, Cathie J.; and Atkinson, Diane, 4,999,077, Cl. 156-299.000.

Campbell, Bruce C.: *See—*
Mruk, William A.; Harrison, Daniel J.; and Campbell, Bruce C., 4,999,335, Cl. 503-227.000.

Campbell, David: *See—*
Walton, John N.; and Campbell, David, 4,998,453, Cl. 81-57.380.

Campbell, Thomas P., to Trans Mar, Inc. Centrifugal jig pulsing system. 4,998,986, Cl. 209-44.000.

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Guiver, Michael D.; and Kutowy, Oleh, 4,999,415, Cl. 528-171.000.

Canadian Patents and Development Limited: *See—*
Capes, C. Edward; Coleman, Richard D.; Croteau, Joseph L. S.; and Thayer, William L., 4,998,624, Cl. 209-5.000.

Canbra Foods Ltd.: *See—*
Freepons, Donald, 4,999,048, Cl. 71-118.000.

Cancelosa, Tammy J.; and Matthews, Tammy J. Cover make-up dispenser. 4,998,838, Cl. 401-202.000.

Canestri, Giuseppe, to Bergvik Kemi AB. Polyesteramide dispersing agent. 4,999,132, Cl. 252-356.000.

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Arai, Hitoshi, 4,999,718, Cl. 358-455.000.
Arikawa, Shiro; and Yonehara, Takao, 4,999,313, Cl. 437-84.000.
Fukahori, Hidehiko; Suzuki, Masayuki; and Aihara, Yoshihiko, 4,999,655, Cl. 354-173.100.

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Iizuka, Kazuo, 4,999,671, Cl. 355-97.000.
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Ito, Yuji; and Miyamoto, Moritoshi, 4,999,513, Cl. 250-575.000.
Kimura, Shinichi, 4,999,788, Cl. 364-518.000.
Kohno, Michio, 4,999,511, Cl. 250-572.000.
Kozuki, Susumu; Ushiro, Tatsuzo; Masui, Toshiyuki; Takei, Masahiro; and Nagasawa, Kenichi, 4,999,722, Cl. 360-77.150.
Matsumura, Isao, 4,999,009, Cl. 351-212.000.
Misumi, Teruo, 4,998,968, Cl. 118-723.000.
Miyata, Masanori; Komiya, Yutaka; Nakamura, Shinichi; Hirose, Masayuki; Mori, Toshihiko; and Nakayama, Tomobumi, 4,999,674, Cl. 355-218.000.
Mizusawa, Nobutoshi; Tanaka, Yutaka; and Ebinuma, Ryuichi, 4,999,506, Cl. 250-491.100.
Murakami, Tsutomu; and Kanai, Masahiro, 4,998,503, Cl. 118-723.000.
Nagashima, Nao, 4,999,717, Cl. 358-448.000.
Niino, Hiroaki, 4,998,979, Cl. 134-1.000.
Nohira, Hiroyuki; Kimura, Takashi; Abe, Tetsuya; Yamada, Yoko; and Yamagishi, Kazuhige, 4,999,130, Cl. 252-299.010.
Ogawa, Masahiko, 4,999,721, Cl. 360-74.100.
Ohta, Masakatsu; Yabu, Shuichi; and Murakami, Junichi, 4,998,821, Cl. 353-122.000.
Okamura, Ryuji; Otoshi, Hirokazu; and Takei, Tetsuya, 4,999,214, Cl. 427-39.000.
Saito, Ichiro; Osato, Yoichi; Fujii, Eiichi; and Arao, Kozo, 4,999,260, Cl. 428-694.000.
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Shiraishi, Akihiko; Fujibayashi, Kazuo; and Kato, Masatake, 4,998,801, Cl. 350-162.200.
Suzuki, Takeshi; and Kagami, Yuji, 4,999,016, Cl. 400-88.000.
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Terasawa, Koji, 4,999,643, Cl. 346-1.100.
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Watanabe, Yukio; Hashimoto, Shigeru; and Hosoi, Nobuyuki, 4,999,217, Cl. 427-48.000.

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Ten Eyck, John D., 4,999,168, Cl. 422-179.000.

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Bocchi, David E.; Laackman, Jeffrey T.; and Bach, Stanley M., Jr., 4,998,531, Cl. 128-419.00D.

Carl-Zeiss-Stiftung, Heindenheim/Brenz: *See*—
Sander, Ulrich; and Biber, Klaus, 4,998,810, Cl. 350-528.000.

Carlston, Robert L., to Miner Enterprises, Inc. Side bearing unit for railroad car. 4,998,997, Cl. 267-003.000.

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Carvalho, Americo, to KCR Engine Automotive Parts, Inc. Internal combustion engine timing chain cover. 4,998,515, Cl. 123-195.00C.

Casillan, Angel, to Marion Laboratories. Psyllium tablet composition, method of manufacture and method of use. 4,999,200, Cl. 424-480.000.

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Mouri, Takashi, 4,999,676, Cl. 355-246.000.
Sugiyama, Kazuhiro; and Atsumi, Yoshinori, 4,999,460, Cl. 174-94.00R.

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Cass, Ronald L. Apparatus for forming voids in concrete. 4,998,705, Cl. 249-177.000.

Cassina S.p.A.: *See*—
Pesce, Gaetano, 4,998,773, Cl. 297-446.000.

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Bonnell, Ralph E.; Castello, George C.; and Hoebener, Karl G., 4,998,342, Cl. 29-840.000.

Castro, Herman A.: *See*—
Park, Chin S.; and Castro, Herman A., 4,999,525, Cl. 307-201.000.

Caudle, Wayne E.: *See*—
Roberts, Robert E.; and Caudle, Wayne E., 4,999,033, Cl. 55-181.000.

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Pavanel, Roberto, 4,998,708, Cl. 251-306.000.

Ceccarelli, Stefano: *See*—
Brufani, Mario; Ceccarelli, Stefano; Giannetti, Patrizia; Paesano, Agnese; Scuri, Romolo; and Zanarella, Sergio, 4,999,350, Cl. 514-210.000.

Ceco Corporation, The: *See*—
Mardian, James K. W.; and Holmer, Curtis I., 4,998,598, Cl. 181-284.000.

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Aubert, Guy, 4,999,600, Cl. 335-306.000.

Cetus Corporation: *See*—
Paradise, Carolyn M.; and Bradley, Edward C., 4,999,339, Cl. 514-2.000.

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De Block, Franciscus; Marchesini, Maurizio; and Ceulemans, Raphael, 4,999,121, Cl. 252-8.800.

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Chahine, Richard: *See*—
Bose, Tapan K.; Chahine, Richard; and St-Arnaud, Jean-Marie, 4,999,330, Cl. 502-402.000.

Cham, Kit M.; and Gleason, Robert E., Jr., to Hewlett-Packard Company. BICMOS logic gate with higher pull-up voltage. 4,999,523, Cl. 307-570.000.

Champagne, Kirby J. Bicycle clamp-on water bottle bosses. 4,998,652, Cl. 224-39.000.

Chan, C. S., to Hewlett-Packard Company. Ink supply apparatus for rapidly coupling and decoupling a remote ink source to a disposable ink jet pen. 4,999,652, Cl. 346-140.00R.

Chang, Albert L.: *See*—
Vincent, Philip M.; Chang, Albert L.; and Martorell, Ivan A., 4,999,793, Cl. 364-569.000.

Chapin, David S. Carpenter's tape measure with push on-push off locking mechanism. 4,998,356, Cl. 33-767.000.

Charowsky, Deborah A.; and Charowsky, Harry P. Medical drape for laser surgery. 4,998,538, Cl. 128-856.000.

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Charowsky, Deborah A.; and Charowsky, Harry P., 4,998,538, Cl. 128-856.000.

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Kogan, Patricia W.; Rudnic, Edward M.; Sequeira, Joel A.; and Chaudry, Imtiaz A., 4,999,189, Cl. 424-79.000.

Chavkin, Leonard: *See*—
Mackles, Leonard; and Chavkin, Leonard, 4,999,183, Cl. 424-47.000.

Chazono, Hirokazu: *See*—
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,736, Cl. 361-321.000.
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,737, Cl. 361-321.000.
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,738, Cl. 361-321.000.
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,739, Cl. 361-321.000.

Chechik, Rachel: *See*—
Breskin, Amos; and Chechik, Rachel, 4,999,500, Cl. 250-385.100.

Chemcut Corporation: *See*—
Ash, James J., 4,999,079, Cl. 156-345.000.

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Allen, Michael P.; and Shibuya, Robert B., 4,999,287, Cl. 435-11.000.

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Dhong, Sang H.; Chen, Chih-Liang; and Shin, Hyun J., 4,999,518, Cl. 307-446.000.

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Chen, Ming-Hsiung. Innovative structure of christmas light assembly. 4,999,751, Cl. 362-226.000.
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Chen, Shien-Chang; Cheng, Wan-Jy; Lin, Fu-Shen; and Huang, Fu-Juh, to Dairen Chemical Corporation. Process for the preparation of high purity carbon monoxide. 4,999,177, Cl. 423-415.00A.
Cheng, Hsien C.: *See—*
Jones, Winton D.; Dage, Richard C.; Claxton, George P.; Cheng, Hsien C.; and Robinson, Phillip J., 4,999,431, Cl. 546-168.000.
Cheng, Se L., to Alltrade, Inc. Display and storage rack. 4,998,629, Cl. 211-71.000.
Cheng, Wan-Jy: *See—*
Chen, Shien-Chang; Cheng, Wan-Jy; Lin, Fu-Shen; and Huang, Fu-Juh, 4,999,177, Cl. 423-415.00A.
Cheresnowsky, Michael J., to GTE Products Corporation. Method for separating tungsten from molybednum. 4,999,169, Cl. 423-54.000.
Chernow, Fred; and Peterson, Randy J. Software distribution system. 4,999,806, Cl. 364-900.000.
Cherry Semiconductor Corporation: *See—*
Gontowski, Walter S., 4,999,527, Cl. 307-273.000.
Cherveny, Albert G. Gravity fed remote mail delivery indicator. 4,999,612, Cl. 340-569.000.
Chevillon, Francis: *See—*
Martin, Claude; and Chevillon, Francis, 4,999,616, Cl. 340-674.000.
Chiarella, Michele A. Method for making an anatomical multilayer bicycle-type seat. 4,999,068, Cl. 156-78.000.
Chida, Shohei; Kozaki, Masami; Asahi, Toshinori; Ono, Chiyoaki; Iwasa, Seiji; Fukunaga, Taizou; and Takemura, Moriyuki, to Zaidan Hohjin Doboku Kenkyu Center; Nittoku Kensetsu Kabushiki Kaisha; Nippon Hyumukan Kabushiki Kaisha; and Kabushiki Kaisha Kobe Seiko Sho. Shield tunneling with optional section and machine. 4,998,776, Cl. 299-59.000.
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Moody, Lawrence G.; Childress, Thomas E.; Pitrolo, Robert L.; Ritscher, James S.; and Leichliter, Ronald P., 4,999,446, Cl. 556-470.000.
Chiman, Hwang. Refillable ink ribbon cartridge for use in an electronic typewriter. 4,998,833, Cl. 400-208.000.
Chin, Albert K.; Nobles, Anthony A.; and Lai, Kwok Y., to Fogarty, Thomas J. Real time angioscopy imaging system. 4,998,972, Cl. 128-6.000.
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Soos, Rudolf; Nemes, Jozsef; Szelestei, Miklos; Schler, Istvan; Vidra, Laszlo ; and Szekely, Istvan, 4,999,454, Cl. 560-213.000.
Chlanda, Frederick P.; and Mani, Krishnamurthy N., to Allied-Signal Inc. Recovery of mixed acids from mixed salts. 4,999,095, Cl. 204-182.400.
Cho, Alfred Y.: *See—*
Capasso, Federico; Cho, Alfred Y.; and Sen, Susanta, 4,999,697, Cl. 357-34.000.
Choo, Tat Y., to Morton International. Method of treating spent dry-film stripping and developing solutions with a chemical mixture. 4,999,114, Cl. 210-709.000.
Christ, Hubert: *See—*
Grimm, Erwin; Koch, Christian; Hausler, Volker; Pfenning, Helmut; and Christ, Hubert, 4,998,481, Cl. 104-166.000.
Christie, Frederick R.; Papathomas, Kostas I.; and Wang, David W., to International Business Machines Corporation. Solder interconnection structure and process for making. 4,999,699, Cl. 357-65.000.
Chrysler Corporation: *See—*
Biermacher, Richard F.; Tallon, Thomas G.; Black, Dwayne A.; and Barton, Billy J., 4,998,766, Cl. 296-136.000.
Black, Gregg T.; and Goulart, Joseph F., 4,998,524, Cl. 123-559.100.
Corwin, John M., 4,999,158, Cl. 420-8.000.
Nogle, Thomas D., 4,998,450, Cl. 74-850.000.
Safran, William M.; and Edwards, James D., 4,998,772, Cl. 297-355.000.
Towne, Raymond A.; Snow, Robert T.; and Preseby, Harry J., 4,998,446, Cl. 74-473.00R.
Chubb National Foam, Inc.: *See—*
Norman, Edward C.; and Regina, Anne C., 4,999,119, Cl. 252-3.000.
Chun, Jung-Hoon: *See—*
Sanchez-Caldera, Luis E.; Lee, Arthur K.; Suh, Nam P.; and Chun, Jung-Hoon, 4,999,050, Cl. 75-244.000.
Chun, Victor L.; and Hunter, James R., to Murata Wiedemann, Inc. Multitool punch holder. 4,998,958, Cl. 83-133.000.
CH_2M Hill, Inc.: *See—*
Wright, Ronald F., 4,999,670, Cl. 355-91.000.
Ciba-Geigy Corporation: *See—*
Fankhauser, Peter, 4,999,379, Cl. 514-567.000.
Lehmann, Urs; and Hoegerle, Karl, 4,999,027, Cl. 8-543.000.
Prestel, Helmut; and Muller, Klaus, 4,999,433, Cl. 548-260.000.
Rempfler, Hermann, 4,999,046, Cl. 71-92.000.
Shillito, Raymond D.; Paszkowski, Jerzy; and Potrykus, Ingo, 4,999,299, Cl. 435-240.470.
van den Bergh, Hubert; and Wagnieres, Georges, 4,998,797, Cl. 350-96.210.
Waldner, Adrian; and Meyer, Willy, 4,999,426, Cl. 544-127.000.
Ciba-Geigy Corproation: *See—*
Cantatore, Giuseppe; and Borzatta, Valerio, 4,999,392, Cl. 524-99.000.
Cibor, Michael K. Tree hung ornamental dimmer. 4,999,544, Cl. 315-185.00S.
Cioca, Gheorghe; Hayward, James A.; Tan, Manuel L.; Herstein, Morris; and Smith, Walter P., to Estee Lauder Inc. Liquid crystal containing cosmetic and pharmaceutical compositions and methods for utilizing such compositions. 4,999,348, Cl. 514-171.000.
Cismoski, Frank J. Method and apparatus for grip enhancing. 4,998,546, Cl. 134-40.000.
Citizen Watch Co., Ltd.: *See—*
Takahashi, Shoji, 4,999,725, Cl. 360-105.000.
Claas OHG: *See—*
Kersting, Hermann, 4,998,904, Cl. 460-70.000.
Claritek Instruments Inc.: *See—*
Silveston, Peter L., 4,999,514, Cl. 250-575.000.
Clauberg, Rolf: *See—*
Beha, Johannes G.; Blacha, Armin U.; Clauberg, Rolf; and Seitz, Hugo K., 4,999,577, Cl. 324-158.00R.
Claxton, George P.: *See—*
Jones, Winton D.; Dage, Richard C.; Claxton, George P.; Cheng, Hsien C.; and Robinson, Phillip J., 4,999,431, Cl. 546-168.000.
Claxton, Philander P., III; McDade, George L.; and Schaffer, Jon D., to Medical Devices Limited Partnership. Blood pressure monitor with compensation for physique and method of use. 4,998,534, Cl. 128-670.000.
Cleary, Arthur L.: *See—*
Duffield, Peter L.; and Cleary, Arthur L., 4,999,651, Cl. 346-140.00R.
Clemens, James T.; and Hong, Shane Y., to AT&T Bell Laboratories. Apparatus comprising an electrostatic wafer cassette. 4,999,507, Cl. 250-492.200.
Cloete, Thomas E.: *See—*
Cronje, Izak J.; Cloete, Thomas E.; and Dekker, Johannes, 4,999,202, Cl. 424-683.000.
Clough, John M.: *See—*
Anthony, Vivienne M.; Clough, John M.; Godfrey, Christopher R. A.; and Wiggins, Thomas E., 4,999,042, Cl. 71-88.000.
Clynes, Manfred. Technique for contouring amplitude of musical notes based on their relationship to the succeeding note. 4,999,773, Cl. 364-419.000.
Coates, Clarence A., Jr.: *See—*
Krutak, James J.; Weaver, Max A.; Coates, Clarence A., Jr.; Hilbert, Samuel D.; Pruett, Wayne P.; and Parham, William W., 4,999,418, Cl. 528-272.000.
Cobb, Alva C.: *See—*
Richter, Simon J.; and Cobb, Alva C., 4,998,990, Cl. 222-92.000.
Coburn, Joseph W., Jr. Processes of mass manufacturing a plurality of security cards and processes of manufacturing security card substrates from which a plurality of security cards may be further manufactured. 4,999,075, Cl. 156-209.000.
Coca-Cola Company, The: *See—*
Richter, Simon J.; and Cobb, Alva C., 4,998,990, Cl. 222-92.000.
Cocanougher, Daniel; Montoye, Robert K.; Nguyenphu, Myhong; and Runyon, Stephen L., to International Business Machines Corporation. Floating point arithmetic two cycle data flow. 4,999,802, Cl. 364-748.000.
Coduti, Phillip L.; and McDaniel, Louis, to Inland Steel Company. Coiled steel strip with solid lubricant coating. 4,999,241, Cl. 428-340.000.
Coffman, Steven G.: *See—*
Salibello, Cosmo; Torrey, Jonathan G.; Coffman, Steven G.; and Murch, Gerald M., 4,998,820, Cl. 351-243.000.
Cogema: *See—*
Petit, Bernard, 4,999,154, Cl. 376-446.000.
Cohen, Donald M.; and Thacker, James R., to Siemens-Pacesetter, Inc. Travenously placed defibrillation leads. 4,998,975, Cl. 128-419.00D.
Coherent, Inc.: *See—*
Negus, Daniel K., 4,999,840, Cl. 372-18.000.
Colbry, Brian W.: *See—*
Blahut, Donald E.; Colbry, Brian W.; Lovett, Thomas D.; and LaMaster, Peter V., 4,999,808, Cl. 364-900.000.
Coleman, Richard D.: *See—*
Capes, C. Edward; Coleman, Richard D.; Croteau, Joseph L. S.; and Thayer, William L., 4,998,624, Cl. 209-5.000.
Colgate-Palmolive Co.: *See—*
Sherman, Adam, 4,998,646, Cl. 222-107.000.
Sonenstein, Gerard G., 4,999,128, Cl. 252-174.140.
Collaborative Research, Inc.: *See—*
Broeze, Robert J.; and Vovis, Gerald F., 4,999,194, Cl. 424-94.630.
Collier, Donald W.: *See—*
Williamson, Lon A.; Pennypacker, Frank C.; Collier, Donald W.; and Fuller, Kip L., 4,999,613, Cl. 340-573.000.
Colodner, Jesse L.: *See—*
Bruzek, Dana; and Colodner, Jesse L., 4,998,654, Cl. 224-204.000.
Coltec Industries Inc.: *See—*
McAuliffe, Lawrence, Jr., 4,998,559, Cl. 137-596.170.
Comer, Clarence M.: *See—*
Lockwood, Frances E.; Lazar, James G.; and Comer, Clarence M., 4,999,122, Cl. 252-32.500.
Comerford, Ernest; and Adamek, Michael, to Comerford, Ernest. Dive parameter indicating assembly. 4,999,606, Cl. 340-525.000.
Cominco Ltd.: *See—*
Mawer, Eric L.; Vanderminnen, Martin; Willans, Robert D. H.; Graham, Michael; and Manwell, Robert E., 4,998,579, Cl. 164-130.000.

Compaa Computer Corporation: *See—*
Culley, Paul R.; and McGraw, Montgomery, 4,999,805, Cl. 364-900.000.
Compressor Components Textron Inc.: *See—*
Moracz, Donald J., 4,999,093, Cl. 204-129.100.
Compton, Roy C. Stack cap covering system. 4,998,398, Cl. 52-745.000.
Comte, Marie-Therese; Gueremy, Claude; and Ponsinet, Gerard, to Rhone-Poulenc. Isoindolinone derivatives, processes for preparing them and medicines containing them. 4,999,355, Cl. 514-253.000.
Condor, Inc.: *See—*
Ingman, Thomas M., 4,999,594, Cl. 333-181.000.
Cone, Richard E., to Cosco, Inc. Convertible infant restraint device. 4,998,307, Cl. 5-94.000.
Conklin, Robert J.: *See—*
Meyer, Karen M.; Liggett, Michael D.; Conklin, Robert J.; and Barker, Charles J., 4,998,707, Cl. 251-129.150.
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Le, Hanh T., 4,999,123, Cl. 252-51.50R.
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Fu, Ta-Wei; and Katz, Manfred, 4,999,099, Cl. 208-39.000.
Griffin, Robert R.; Roussel, Keith M.; and Fu, Ta-Wei, 4,998,709, Cl. 264-29.500.
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Andrianos, Nikos P., 4,999,534, Cl. 310-90.500.
Contreras, Orlando. Coffee dispenser. 4,998,648, Cl. 222-370.000.
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Ralph, John T.; Beckley, Guy B.; Brady, Frank T.; Jelenek, Ivan; Korn, Darryl K.; Meyer, John; Nay, Daniel L.; Searle, Colin M.; Shick, David; Williams, Richard W.; and Wilson, Jon C., deceased, 4,999,771, Cl. 364-200.000.
Cook, William R.: *See—*
Perfetti, Patricia F.; and Cook, William R., 4,998,541, Cl. 131-336.000.
Cooper, Erwin E. Wide band color correcting infrared lens system. 4,999,005, Cl. 350-1.400.
Cooper Industries, Inc.: *See—*
Hart, Brian, 4,998,756, Cl. 285-298.000.
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Caulkett, Peter W. R.; Cooper, Michael J.; Eakin, Murdoch; and Jones, Geraint, 4,999,377, Cl. 514-507.000.
Coovert, Richard E.; and King, Christopher N., to Planar Systems, Inc. Electrode configuration for reducing contact density in matrix-addressed display panels. 4,999,539, Cl. 313-505.000.
Copeland Corporation: *See—*
Muir, Earl B., 4,998,864, Cl. 417-410.000.
Copeland, James L., to Ecolab Inc. Solid block chemical dispenser for cleaning systems. 4,999,124, Cl. 252-90.000.
Corbin, Robert W.; Detwiler, William E.; and Kolb, Steven E., to Xerox Corporation. Cleaning apparatus with housing and brush biased to the same magnitude and polarity. 4,999,679, Cl. 355-303.000.
Cordery, Robert A.; and Hartings, Michael F., to Monarch Marking Systems, Inc. Magnetic antenna system having independently controllable electrical field shielding and magnetic field balance. 4,999,641, Cl. 343-742.000.
Corovin GmbH: *See—*
Boich, Heinz-H., 4,999,080, Cl. 156-441.000.
Corretge, Eugene: *See—*
Ikada, Yoshito; Konishi, Hikaru; Corretge, Eugene; and Imamura, Kazuo, 4,999,110, Cl. 210-490.000.
Corrigan, John: *See—*
Lane, Jan M.; Corrigan, John; and Crouch, Philip D., 4,998,581, Cl. 164-517.000.
Cortes, Hernan J.: *See—*
Melcher, Richard G.; and Cortes, Hernan J., 4,999,105, Cl. 210-198.200.
Corwin, John M., to Chrysler Corporation. Oxidation resistant iron base alloy compositions. 4,999,158, Cl. 420-8.000.
Cosco, Inc.: *See—*
Cone, Richard E., 4,998,307, Cl. 5-94.000.
Costello, Clifford T. Electrical wiring method and apparatus. 4,998,343, Cl. 29-857.000.
Costello, Norman F.: *See—*
Guntly, Leon A.; and Costello, Norman F., 4,998,580, Cl. 165-133.000.
Costes, Michel; Gach, Alain; Hartmann, Yves; and Peyronnenc, Michel, to International Business Machines Corporation. System with plural clocks for bidirectional information exchange between DMA controller and I/O devices via DMA bus. 4,999,769, Cl. 364-200.000.
Covey, Joel: *See—*
Mattson, David R.; Covey, Joel; and Weibel, Stephen, 4,999,010, Cl. 356-346.000.
Cowan, James J., to Polaroid Corporation. Holographic optical data storage medium. 4,999,234, Cl. 428-156.000.
Cox, Charles R.: *See—*
Reeves, Robert H., Jr.; Cox, Charles R.; and Montes, Hilario, 4,998,911, Cl. 493-108.000.
Cox, John R.; and Bulgin, Edward G., to Amalgamated Sugar Company, The. Liquid transfer manifold system for maintaining plug flow. 4,999,102, Cl. 210-137.000.
Creative Assets and Consulting Corporation: *See—*
Restaino, Alfred J., 4,999,419, Cl. 528-322.000.
Cremer, Charles D.: *See—*
Koslover, Robert A.; Cremer, Charles D.; Geren, William P.; Voss, Donald E.; and Miner, Lynn M., 4,999,591, Cl. 333-21.00R.
Crews, Eric J. Timing system. 4,999,604, Cl. 340-323.00R.
Croman, Robert B.; Ghorashi, Hamid M.; and Singh, Gurdial, to Du Pont de Nemours, E. I., and Company. High performance aramid matrix composites. 4,999,395, Cl. 524-607.000.
Cronje, Izak J.; Cloete, Thomas E.; and Dekker, Johannes, to National Energy Council. Composition having bacteriocidal or bacteriostatic acitivity. 4,999,202, Cl. 424-683.000.
Crosfield Electronics Limited: *See—*
Dudley, Neil F., 4,999,526, Cl. 307-269.000.
Crossfield, Michael D., to Scientific Generics Limited. Antipilferage tags having an acoustic resonator chamber. 4,999,609, Cl. 340-551.000.
Croteau, Joseph L. S.: *See—*
Capes, C. Edward; Coleman, Richard D.; Croteau, Joseph L. S.; and Thayer, William L., 4,998,624, Cl. 209-5.000.
Crouch, Philip D.: *See—*
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Crowell, Terry M., to Park Corporation. Gel dispensing apparatus and method. 4,998,850, Cl. 406-48.000.
Crowley, Patrick J.; Glen, Alasdair T.; and Spence, Rosamund A., to Imperial Chemical Industries PLC. Fungicides. 4,999,381, Cl. 514-618.000.
Crowther, Russell L.: *See—*
Johansson, Eric B.; Elkins, Robert B.; Crowther, Russell L.; and Matzner, Bruce, 4,999,153, Cl. 376-443.000.
Crucible Materials Corporation: *See—*
Yolton, Charles F.; Lizzi, Thomas; and Moll, John H., 4,999,051, Cl. 75-338.000.
Culley, Paul R.; and McGraw, Montgomery, to Compaa Computer Corporation. Extended input/output circuit board addressing system. 4,999,805, Cl. 364-900.000.
Cummings, Robert E.: *See—*
Bouchard, William L.; Cummings, Robert E.; Kalinowski, Paul W.; and Sudol, Charles W., 4,998,384, Cl. 51-168.000.
Curiel, Yoram, to TSL Incorporated. Tamper evident closure and associated method. 4,998,989, Cl. 215-250.000.
Curl, Ricky L., to Atlas Technology, Inc. Power surge protection circuit. 4,999,728, Cl. 361-33.000.
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Killeen, Gregory J., 4,998,349, Cl. 30-131.000.
Curtis, R. Eugene; Narayanan, G. Hari; and Quist, William E., to Boeing Company, The. Low temperature underaging of lithium bearing alloys and method thereof. 4,999,061, Cl. 148-12.70A.
Cuypers, Martinus H., to Van Doorne's Transmissie B.V. Transmission chain for a continuously variable conical pulley drive. 4,998,908, Cl. 474-245.000.
CVD Incorporated: *See—*
Kanjolia, Ravi K.; and Hui, Benjamin C., 4,999,223, Cl. 427-252.000.
D & L Incorporated: *See—*
Starkey, Donald R., 4,998,875, Cl. 425-577.000.
Dacey, Ernest A., Jr., to Utica Enterprises, Inc. Method for body panel attachment. 4,998,332, Cl. 29-90.010.
Dage, Richard C.; and Schnettler, Richard A., to Merrell Dow Pharmaceuticals Inc. Method of reducing reperfusion injury with imidazol-2-thiones. 4,999,365, Cl. 514-341.000.
Dage, Richard C.: *See—*
Jones, Winton D.; Dage, Richard C.; Claxton, George P.; Cheng, Hsien C.; and Robinson, Phillip J., 4,999,431, Cl. 546-168.000.
D'Agostino, Saverio A.: *See—*
Longerich, Ernest P.; and D'Agostino, Saverio A., 4,998,688, Cl. 244-3.160.
Daihatsu Motor Co., Ltd.: *See—*
Yamada, Takahiro; Kurahashi, Kazuyoshi; and Watanabe, Shyuji, 4,998,379, Cl. 49-138.000.
Daimler-Benz AG: *See—*
Feichtiger, Dieter; Holzhauer, Horst; Kneib, Rudi; Polic, Marko; and Weikert, Gunther, 4,998,447, Cl. 74-502.600.
Ruhl, Thomas; Muller, Armin; and Hinrichs, Wolfgang, 4,999,778, Cl. 364-426.020.
Schussler, Robert; and Acker, Bernd, 4,999,777, Cl. 364-424.050.
Dairen Chemical Corporation: *See—*
Chen, Shien-Chang; Cheng, Wan-Jy; Lin, Fu-Shen; and Huang, Fu-Juh, 4,999,177, Cl. 423-415.00A.
Dale, John R.; and Holler, Roger A., to United States of America, Navy. Hydrophone deployment system for a sonobuoy. 4,999,816, Cl. 367-4.000.
Dalebout, William T.: *See—*
Watterson, Scott R.; Standing, Donald J.; and Dalebout, William T., 4,998,725, Cl. 272-129.000.
D'Aleo, Michael J.: *See—*
Vink, Timothy; Burkholder, Robert F.; D'Aleo, Michael J.; Elsbury, Andrew; Flowers, Woodie; Lordo, Richard; and McCall, Shawn R., 4,998,635, Cl. 220-3.400.
Dalgety Produce, Inc.: *See—*
Fischer, Rich; Silva, Richard; and Welton, Henry P., 4,998,465, Cl. 99-584.000.
Dalziel, John: *See—*
Elliott, Raymond; Dalziel, John; and Sunley, Raymond L., 4,999,043, Cl. 71-92.000.
Damco Testers, Inc.: *See—*
Miller, Ronnie F.; Dwyer, Arthur L.; Miller, Darwin A.; and Miller, Darwin L., 4,998,435, Cl. 73-40.700.
D'Amore, William M., Jr. Jewelry closure device. 4,998,330, Cl. 24-700.000.

Dana Corporation: *See—*
Ellis, William P., Jr., 4,998,448, Cl. 74-573.00R.

Dane, Derek R.: *See—*
Ainsworth, Steven J. H.; and Dane, Derek R., 4,999,764, Cl. 364-167.010.

D'Antonio, Michael J.; Gibbs, Irving A.; Lane, Lawrence J.; and Lawson, Rodney A., to General Electric Company. Power system stabilizer system having improved integrity checking scheme. 4,999,564, Cl. 322-99.000.

Das, Sudeb: *See—*
Ahmad, Nawaz; Ziets, George A.; and Das, Sudeb, 4,999,342, Cl. 514-54.000.

DasGupta, Arijit M.: *See—*
Misra, Ashok; David, Donald J.; and DasGupta, Arijit M., 4,999,078, Cl. 156-327.000.
Misra, Ashok; David, Donald J.; and DasGupta, Arijit M., 4,999,253, Cl. 428-515.000.

DaSilva, Marcus, to Hewlett-Packard Company. Low phase noise voltage controlled oscillator. 4,999,589, Cl. 331-117.00R.

Dassanayake, Lincoln. Veterinary treatment. 4,999,374, Cl. 514-451.000.

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David, Donald J.: *See—*
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David, John. Safety quick hitch. 4,998,745, Cl. 280-508.000.

Davidowich, George: *See—*
Iacoviello, John G.; Davidowich, George; Vijayendran, Bheema R.; and Sadowski, John S., 4,999,239, Cl. 428-288.000.

Davis, John W. Shower apparatus. 4,998,305, Cl. 4-604.000.

Davis Meditech, Inc.: *See—*
Harris, Arthur, 4,998,866, Cl. 417-460.000.

Davydov, Anatoly B.: *See—*
Solodovnik, Valentin D.; Solodkaya, Tatyana I.; Litvinova, Maria T.; Meshkova, Taisa A.; Usova, Alexandra V.; and Davydov, Anatoly B., 4,999,188, Cl. 424-78.000.

Dawson, Karl A.: *See—*
Zavos, Panayiotis M.; and Dawson, Karl A., 4,999,283, Cl. 435-2.000.

Deacon, David A. G., to Deacon Research. Amplifier-oscillator free electron laser. 4,999,839, Cl. 372-2.000.

Deacon Research: *See—*
Deacon, David A. G., 4,999,839, Cl. 372-2.000.

Dear, Stephen L.: *See—*
Pemberton, John H.; and Dear, Stephen L., 4,998,334, Cl. 29-239.000.

Debesis, John R., to Eastman Kodak Company. Non-contact optical print head for image writing apparatus. 4,999,648, Cl. 346-107.00R.

de Bievre, Paul: *See—*
Vansant, Etienne; Peeters, Guido; de Bievre, Paul; and van Gompel, Remi, 4,999,175, Cl. 423-244.000.

De Block, Franciscus; Marchesini, Maurizio; and Ceulemans, Raphael, to Procter & Gamble Company, The. Method for preparing textile treatment compositions: adding molten softening agent to aqueous acid solution. 4,999,121, Cl. 252-8.800.

Debus, Jurgen: *See—*
Reuter, Wolfgang; Debus, Jurgen; and Lehr, Lothar, 4,998,702, Cl. 248-278.000.

deCastro, Aurora F.; Gupta, Surendra K.; and Shantz, Steven M., to GDS Technology, Inc. Test composition and method for the determination of anilides. 4,999,288, Cl. 435-18.000.

Deeds, Ted D.: *See—*
Koechlein, Gregg W.; Wizemann, Werner O.; and Deeds, Ted D., 4,998,557, Cl. 137-505.420.

Deeg, H. Joachim: *See—*
Slichter, Sherrill J.; and Deeg, H. Joachim, 4,998,931, Cl. 604-20.000.

Degawa, Toru: *See—*
Ototani, Tohei; Degawa, Toru; Kusumoto, Kanichi; and Ebata, Makoto, 4,999,053, Cl. 75-564.000.

Degussa Aktiengesellschaft: *See—*
Deschler, Ulrich; Lechner, Ulrike; and Witzel, Michael, 4,999,249, Cl. 428-447.000.
Panster, Peter; Grethe, Horst; and Kleinschmit, Peter, 4,999,413, Cl. 528-30.000.

Dehne, Wilfried E., to Fibro, Inc. Conveyor apparatus. 4,998,860, Cl. 414-750.000.

Dekker, Johannes: *See—*
Cronje, Izak J.; Cloete, Thomas E.; and Dekker, Johannes, 4,999,202, Cl. 424-683.000.

Delany, John J., to Eastman Kodak Company. Selective pyrazoline insecticides and fungicides, compositions and use. 4,999,368, Cl. 514-403.000.

Delco Electronics Corporation: *See—*
Jones, Christopher W., 4,999,550, Cl. 318-50.000.

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Durkin, Michael D., 4,999,767, Cl. 364-200.000.

Dell Marking Systems, Inc.: *See—*
Grattan, Michael A.; and Wolberg, Sheldon J., 4,999,645, Cl. 346-1.100.

Delphax Systems: *See—*
McCallum, Robert S., 4,999,653, Cl. 346-159.000.

Delsanti, Gerard L. Method of using removable endo-arterial devices to repair detachments in the arterial walls. 4,998,539, Cl. 128-898.000.

DeMaris, Elbert E. High speed rotational dispersion device using short shear path. 4,999,015, Cl. 366-176.000.

Demura, Makoto: *See—*
Asakura, Tetsuro; Demura, Makoto; and Kuroo, Takeshi, 4,999,295, Cl. 435-177.000.

Deneuve, Francoise: *See—*
Gourlaouen, Claire; Magnier, Claude; Latourrette, Bertrand; Tugaye, Anne; and Deneuve, Francoise, 4,999,180, Cl. 423-592.000.

Denis, Jean F.; Lepicard, Alain; and Ropars, Henri, to Thomson-Brandt Armements. Pneumatic unlocking device for munitions releasable from a carrier. 4,998,480, Cl. 102-393.000.

Dennison Manufacturing Company: *See—*
Deschenes, Charles L.; Bourque, Donald L.; and Backholm, Philip G., 4,998,661, Cl. 227-67.000.

Densit A/S Rordalsuej: *See—*
Rasmussen, Thorkild H., 4,999,056, Cl. 106-737.000.

Deringer, Helmut: *See—*
Kehl, Georg; Siegel Heinz; Deringer, Helmut; Rischen, Dietmar; Abbing, Andreas; and Bullinger, Alfred, 4,998,781, Cl. 303-10.000.

Derrick, Dennis D., to General Motors Corporation. Center compensating master cylinder. 4,998,950, Cl. 60-562.000.

DeSarno, James G., to Winpro Industries. Umbrella with canopy rotator joint. 4,998,551, Cl. 135-20.00R.

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Deschler, Ulrich; Lechner, Ulrike; and Witzel, Michael, to Degussa Aktiengesellschaft. Mixtures containing organosilicon compounds and their use for waterproofing and antimicrobial impregnation. 4,999,249, Cl. 428-447.000.

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DeSoto, Inc.: *See—*
Gaske, Joseph; Krajewski, John J.; and Noren, Gerry K., 4,999,216, Cl. 427-44.000.

Detwiler, William E.: *See—*
Corbin, Robert W.; Detwiler, William E.; and Kolb, Steven E., 4,999,679, Cl. 355-303.000.

Deutsch, Reinhard. Device for enhancing the buoyancy of sailboards and the like. 4,998,494, Cl. 114-39.200.

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Rau, Roland, 4,998,537, Cl. 128-80.00H.

Deville, Yannick, to U.S. Philips Corp. Active RC filter circuit for use as a band-stop filter. 4,999,522, Cl. 307-520.000.

Devlin, Brian R.: *See—*
Littlejohn, Douglas J.; Modlin, Douglas; Ingrum, Jerry G.; and Devlin, Brian R., 4,998,824, Cl. 356-407.000.

DeWitt, Bernard C.; and Ho, Ying-wai, to Motorola, Inc. Sticky bit detection and shifting logic. 4,999,796, Cl. 364-715.080.

Dhainaut, Alain: *See—*
Regnier, Gilbert; Dhainaut, Alain; Vilaine, Jean-Paul; Villeneuve, Nicole; Joly, Ghislaine; and Duhault, Jacques, 4,999,372, Cl. 514-422.000.

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Diederich, Anthony F., Jr., to Ford New Holland, Inc. Method of wrapping bales with twine. 4,998,469, Cl. 100-2.000.

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Erlenmaier, Gunter; and Spies, Klaus, 4,998,783, Cl. 305-56.000.

Diehl GmbH & Co.: *See—*
Rudenauer, Werner; Muller, Fritz; and Furtmayr, Joachim, 4,998,476, Cl. 102-226.000.

Dighe, Shyam V.; Taylor, Raymond F., Jr.; Steffen, Robert J.; and Rohaus, David M., to Westinghouse Electric Corp. Process and apparatus for treatment of excavated landfill material in a plasma fired cupola. 4,998,486, Cl. 110-346.000.

Digital Equipment Corporation: *See—*
Turrini, Silvio; Leonard, Judson S.; and Jouppi, Norman P., 4,999,803, Cl. 364-748.000.

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Elings, Virgil B., 4,999,494, Cl. 250-306.000.

Dillmann, Hermann-Josef: *See—*
Geyer, Gerhard; Mendle, Johann; and Dillmann, Hermann-Josef, 4,998,523, Cl. 123-502.000.

Dimier, Jean-Pierre; and Pascal, Roger, to Salomon S.A. Modified universal ski binding for use with different ski boots, and boots specific to certain bindings. 4,998,747, Cl. 280-631.000.

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Pohl, Christopher; Slingsby, Roseanne W.; Stillian, John R.; and Gajek, Ryszard, 4,999,098, Cl. 204-301.000.

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Minoura, Norihiko; Aiba, Seiichi; and Fujiwara, Yukihiko, 4,999,297, Cl. 435-240.230.

Dischler, Louis, to Milliken Research Corporation. Method of making an insole product. 4,999,072, Cl. 156-145.000.

Distefano, Joseph; Haas, Roger; Nestle, Mark; and Kelley, Fred D., to Eastman Kodak Company. Drilled unported vacuum drum with a porous sleeve. 4,998,658, Cl. 226-95.000.

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Lowrey, Tyler A.; and Doan, Trung T., 4,999,160, Cl. 420-529.000.

Dobler, Walter; Paust, Joachim; and Betz, Roland, to BASF Aktiengesellschaft. Preparation of ascorbic acid 2-phosphate and of 5, 6-isopropylideneascorbic acid and potassium magnesium l-ascorbate 2-phosphate as an advantageous salt of l-ascorbic acid 2- phosphate. 4,999,437, Cl. 549-222.000.

Dobuler, Walter; Schul, Wolfgang; Paust, Joachim; and Mitschker, Alfred, to BASF Aktiengesellschaft. Removal of thiamine monophosphate from a solution of thiamine. 4,999,112, Cl. 210-656.000.

Dr. Johannes Heidenhain GmbH: *See*—
Affa, Alfred, 4,999,623, Cl. 341-13.000.

Dr. Lo Zambeletti S.p.A.: *See*—
Vecchietti, Vittorio; and Giardina, Giuseppe, 4,999,359, Cl. 514-301.000.

Doi, Yoshiharu; Soga, Kazuo; and Ueki, Satoshi, to Toa Nenryo Kogyo Kabushiki Kaisha. Diolefin polymer of copolymer and a process for the production of the same. 4,999,409, Cl. 526-169.200.

Doittau, Francois X.: *See*—
Bourcier, Henri; and Doittau, Francois X., 4,999,548, Cl. 315-370.000.

Domb, Abraham J., to Nova Pharmaceutical Corporation. Biodegradable polymer compositions. 4,999,417, Cl. 528-271.000.

Donaldson, Andrew H. Tool for form stake removal. 4,998,312, Cl. 7-166.000.

DonMichael, T. Anthony. Resuscitation aid. 4,998,530, Cl. 128-203.110.

Donofrio, David M.: *See*—
Wolfe, Richard A.; Heifetz, Aaron H.; Braatz, James A.; and Donofrio, David M., 4,999,298, Cl. 435-240.242.

Donovan, William F.: *See*—
Schmidt, Edward M.; and Donovan, William F., 4,998,994, Cl. 244-3.100.

Dopp, Robert B., to Rayovac Corporation. Alkaline cells containing fluorescent dyes. 4,999,265, Cl. 429-198.000.

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Erhardt, Wolfgang, 4,998,528, Cl. 128-24.00A.

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Dostall, Gregory W.; and Saloom, Thomas J., to Alcan Aluminum Corporation. Corner cap structure and method. 4,998,947, Cl. 52-300.000.

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Rehmer, Gerd; Schwartz, Manfred; and Dotzauer, Bernhard, 4,999,218, Cl. 427-54.100.

Douesnel, Xavier: *See*—
Toupin, Joseph F.; and Douesnel, Xavier, 4,999,615, Cl. 340-590.000.

Douglas, Monte A., to Texas Instruments Incorporated. Method for suppressing ionization avalanches in a helium wafer cooling assembly. 4,999,320, Cl. 437-225.000.

Doull, Hubert K., to Omni Medical Systems Inc. Medication dispensing package. 4,998,623, Cl. 206-531.000.

Dow Chemical Company, The: *See*—
Kirchhoff, Robert A., 4,999,449, Cl. 560-8.000.
McCullough, Francis P., Jr.; and Matoy, Robert L., 4,999,236, Cl. 428-233.000.
McCullough, Francis P., Jr.; Hall, David M.; Stobby, William G.; and Suh, Kyung W., 4,999,385, Cl. 521-149.000.
Melcher, Richard G.; and Cortes, Hernan J., 4,999,105, Cl. 210-198.200.
Patton, Robert T., 4,999,025, Cl. 8-111.000.
Smith, Michael G.; Renga, James M.; Riley, Brian K.; Ray, Patricia G.; and Marlowe, Charles, 4,999,448, Cl. 558-411.000.
Webster, Stephen J.; and Melton, Lester L., 4,999,329, Cl. 502-202.000.
Wijeyesekera, Sunil D.; and Heistand, Robert H., II, 4,999,338, Cl. 505-1.000.

Dow Corning Corporation: *See*—
Graiver, Daniel; and Tanaka, Osamu, 4,999,398, Cl. 524-837.000.
Weiss, Keith D.; and Frye, Cecil L., 4,999,397, Cl. 524-755.000.

Dow, Ian J.: *See*—
Kowalczyk, David; Dow, Ian J.; and May, Carl D., 4,998,758, Cl. 292-201.000.

DowBrands Inc.: *See*—
Hurh, Patrick G., 4,998,656, Cl. 225-47.000.

DowElanco: *See*—
Friese, David D.; and Elledge, Jerry M., 4,999,432, Cl. 546-286.000.
Hull, John, Jr., 4,999,427, Cl. 544-242.000.

Drack, Alfred. Plastic pail and lid. 4,998,622, Cl. 206-519.000.

Drackett Company, The: *See*—
Leifheit, David H., 4,998,671, Cl. 239-44.000.

Drake, Charles E.: *See*—
Barth, John E., Jr.; Drake, Charles E.; Hovis, William P.; Kalter, Howard L.; Kelley, Gordon A., Jr.; Lewis, Scott C.; Nickel, Daniel J.; and Yankosky, James A., 4,999,815, Cl. 365-230.060.

Drake, Donald J.; Campanelli, Michael R.; Burke, Cathie J.; and Atkinson, Diane, to Xerox Corporation. Method of fabricating full width scanning or imaging arrays from subunits. 4,999,077, Cl. 156-299.000.

Drake, John W.: *See*—
Wood, James A.; and Drake, John W., 4,999,779, Cl. 364-426.030.

Draxelmayr, Dieter, to Siemens Aktiengesellschaft. Self-calibrating A/D and D/A converter. 4,999,633, Cl. 341-120.000.

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Drexler Technology Corporation: *See*—
Bouldin, Eric W., 4,999,278, Cl. 430-270.000.

Driesel, Will. Fishing lure. 4,998,371, Cl. 43-42.160.

Drive-Master Corp.: *See*—
Ruprecht, Peter B.; and Agostinelli, Mario, 4,998,983, Cl. 192-1.520.

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Richlin, Milton; and Dubeck, Aloysius, 4,998,992, Cl. 223-66.000.

Dubois, Bertrand: *See*—
Baumard, Jean-Francois; Dubois, Bertrand; and Odier, Philippe, 4,999,182, Cl. 423-608.000.

Dudley, Kenneth W.; Edgar, Richard H.; and Eves, E. Eugene, II, to Raytheon Company. Apparatus for microwave heating test coupons. 4,999,469, Cl. 219-10.55A.

Dudley, Neil F., to Crosfield Electronics Limited. Apparatus for synchronizing clock signals. 4,999,526, Cl. 307-269.000.

Duffield, Peter L.; and Cleary, Arthur L., to Vutek Inc. Multi-color recorder with plural ink jets and reservoirs co-mounted on a reciprocating carriage, each reservoir containing a sub-reservoir in communication with an ink supply conduit. 4,999,651, Cl. 346-140.00R.

Dufrene, Randy. Ultralight/compact airboat apparatus. 4,998,898, Cl. 440-37.000.

Duggan, Daniel D., to ITT Corporation. Apparatus and method for making a photocathode. 4,999,211, Cl. 427-8.000.

Duhault, Jacques: *See*—
Regnier, Gilbert; Dhainaut, Alain; Vilaine, Jean-Paul; Villeneuve, Nicole; Joly, Ghislaine; and Duhault, Jacques, 4,999,372, Cl. 514-422.000.

Duke University: *See*—
Selker, Harry P.; Wagner, Galen S.; Weaver, W. Douglas; and Califf, Robert M., 4,998,535, Cl. 128-696.000.

Dumas, William V.: *See*—
Foust, Donald F.; and Dumas, William V., 4,999,251, Cl. 428-458.000.

Dumoulin, Andre; and Gervais, Michel, to Northern Telecom Limited. Method and apparatus for making reinforced insulated electrical conductor. 4,999,148, Cl. 264-174.000.

Dunaway, James H.: *See*—
Freeman, Glenn E.; Valimont, James L.; Dunaway, James H.; and Korenkiewicz, Karen J., 4,998,784, Cl. 350-3.700.

Dunaway, Thomas J.; Spielberger, Richard K.; and Poplett, James M., to Honeywell Inc. Package to board variable pitch tab. 4,999,700, Cl. 357-70.000.

Duncan, Farris N.: *See*—
McElhaney, William L.; Floyd, Roger M.; and Duncan, Farris N., 4,998,667, Cl. 229-120.370.

Dunn, John A.: *See*—
Grimes, William F., Jr.; and Dunn, John A., 4,999,146, Cl. 264-127.000.

Du Pont de Nemours, E. I., and Company: *See*—
Croman, Robert B.; Ghorashi, Hamid M.; and Singh, Gurdial, 4,999,395, Cl. 524-607.000.
Gawel, Len J.; Ng, Thomas; Odom, James M.; and Ebersole, Richard C., 4,999,286, Cl. 435-7.320.
Holtzen, Dwight A.; and Reid, Austin H., Jr., 4,999,055, Cl. 106-436.000.
Jones, David C.; and Lee, Chi-Chang, 4,999,222, Cl. 427-250.000.
LeVan, Martin D., 4,999,232, Cl. 428-113.000.
Merchant, Abid N., 4,999,127, Cl. 252-171.000.
Meyer, Walter C., 4,999,213, Cl. 427-27.000.
Seemuth, Paul D., 4,999,120, Cl. 252-8.600.
Squire, Edward N., 4,999,248, Cl. 428-422.000.
Ward, Michael D.; and Ebersole, Richard C., 4,999,284, Cl. 435-4.000.
Zafiroglu, Dimitri P., 4,998,421, Cl. 66-192.000.

Duracell Inc.: *See*—
Shepard, Vance R., Jr.; and Wolf, Michelle, 4,999,264, Cl. 429-171.000.

Durkin, Michael D., to Dell Corporate Services Corporation. System having cup operation al error warning facility using visual indicator and real-time clock interrupt routine. 4,999,767, Cl. 364-200.000.

Durkoppwerke GmbH: *See*—
Goebbels, Hans R.; Biermann, Kurt; Steppat, Gerhard; Stapel, Wilhelm; Rosemann, Michael; and Seiler, Klaus D., 4,998,490, Cl. 112-231.000.

Durr, Herbert, to Eirich, Walter; Eirich, Paul; and Eirich, Hubert. Agitator ball mill. 4,998,678, Cl. 241-171.000.

Dutzmann, Stefan: *See*—
Holmwood, Graham; Kraatz, Udo; Buchel, Karl H.; Brandes, Wilhelm; Dutzmann, Stefan; and Reinecke, Paul, 4,999,440, Cl. 549-556.000.

Dwek, Raymond A.: *See*—
Fleet, George W. J.; Rademacher, Thomas W.; and Dwek, Raymond A., 4,999,360, Cl. 514-315.000.

Dwivedi, Ratnesh K.; and Irick, Virgil, Jr., to Lanxide Technology Company, LP. Method of making metal matrix composites. 4,998,578, Cl. 164-6.000.

Dwyer, Arthur L.: *See*—
Miller, Ronnie F.; Dwyer, Arthur L.; Miller, Darwin A.; and Miller, Darwin L., 4,998,435, Cl. 73-40.700.

Dwyer, Rowland W., Jr.: *See*—
Kallianos, Andrew G.; Lilly, A. Clifton, Jr.; Whidby, Jerry F.; and Dwyer, Rowland W., Jr., 4,998,542, Cl. 131-365.000.

Dyer, Margaret A.: *See*—
Mele, Thomas C.; Mele, Mary K.; Dyer, Robert C.; and Dyer, Margaret A., 4,999,603, Cl. 340-323.00R.

Dyer, Robert C.: *See*—
Mele, Thomas C.; Mele, Mary K.; Dyer, Robert C.; and Dyer, Margaret A., 4,999,603, Cl. 340-323.00R.
Dzarnoski, John E., Jr.; and Babcock, James W., to Unisys Corporation. Method of fabricating interconnections to I/O leads on layered electronic assemblies. 4,999,311, Cl. 437-51.000.
Eagle Industry Co., Ltd.: *See*—
Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,998,867, Cl. 418-256.000.
Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,998,868, Cl. 418-257.000.
Eakin, Murdoch: *See*—
Caulkett, Peter W. R.; Cooper, Michael J.; Eakin, Murdoch; and Jones, Geraint, 4,999,377, Cl. 514-507.000.
Easom, Peter W. Feeding device having control means, feed rollers, a pulse generator and a photoelectric device for directly measuring rate of feed of an elastic strip having marks thereon for a sewing machine. 4,998,965, Cl. 112-305.000.
Eastman Kodak Company: *See*—
Agostinelli, John A., 4,998,805, Cl. 350-355.000.
Andru, Jean Antoine A., 4,999,503, Cl. 250-472.100.
Braun, Hilarion, 4,999,650, Cl. 346-140.00R.
Bryant, Robert S., 4,999,662, Cl. 354-412.000.
Debesis, John R., 4,999,648, Cl. 346-107.00R.
Delany, John J., 4,999,368, Cl. 514-403.000.
Distefano, Joseph; Haas, Roger; Nestle, Mark; and Kelley, Fred D., 4,998,658, Cl. 226-95.000.
Foust, Gregory B., 4,999,664, Cl. 354-446.000.
Gasper, John; Kulpinski, Robert W.; and Lubinsky, Anthony R., 4,999,505, Cl. 250-484.100.
Joseph, Brian J.; Mort, Thomas W.; Stern, Philip A.; and Westcott, Robert M., 4,999,680, Cl. 355-326.000.
Katerberg, James A.; and Pipkorn, David N., 4,999,644, Cl. 346-1.100.
Krutak, James J.; Weaver, Max A.; Coates, Clarence A., Jr.; Hilbert, Samuel D.; Pruett, Wayne P.; and Parham, William W., 4,999,418, Cl. 528-272.000.
Mruk, William A.; Harrison, Daniel J.; and Campbell, Bruce C., 4,999,335, Cl. 503-227.000.
Porcellio, Rocco J.; and Zimmer, David I., 4,999,715, Cl. 358-433.000.
Schildkraut, Jay S.; Young, Ralph H.; Williams, David J.; and Scozzafava, Michael, 4,999,809, Cl. 365-106.000.
Sparer, Steven J.; and Morris, William I., 4,998,714, Cl. 271-117.000.
Speer, Larry W.; and Westbrook, Susan P., 4,999,675, Cl. 355-245.000.
Vogel, Richard M.; and Milton, Mitchell J., 4,999,714, Cl. 358-337.000.
Wood, Wendell L.; Morris, Brian G.; Aleshire, Dianne J.; and Katerberg, James A., 4,999,647, Cl. 346-75.000.
Wright, Thomas S., 4,999,660, Cl. 354-324.000.
Ebata, Makoto: *See*—
Ototani, Tohei; Degawa, Toru; Kusumoto, Kanichi; and Ebata, Makoto, 4,999,053, Cl. 75-564.000.
Ebata, Yoshikazu: *See*—
Hisatake, Michio; Kongo, Takeshi; Sasako, Hidenori; and Ebata, Yoshikazu, 4,998,489, Cl. 112-103.000.
Ebersole, Richard C.: *See*—
Gawel, Len J.; Ng, Thomas; Odom, James M.; and Ebersole, Richard C., 4,999,286, Cl. 435-7.320.
Ward, Michael D.; and Ebersole, Richard C., 4,999,284, Cl. 435-4.000.
Ebert, Michael: *See*—
Reick, Franklin G., 4,999,322, Cl. 501-83.000.
Ebihara, Masafumi; Akitomo, Takeshi; and Nomura, Minoru, to Research Association for Pulp and Paper Technology. Twin wire forming apparatus with positive pressure foils. 4,999,087, Cl. 162-301.000.
Ebinuma, Ryuichi: *See*—
Mizusawa, Nobutoshi; Tanaka, Yutaka; and Ebinuma, Ryuichi, 4,999,506, Cl. 250-491.100.
ECC International Limited: *See*—
Goodman, Howard, 4,999,125, Cl. 252-90.000.
Eckhardt, David A.: *See*—
Landt, Jeremy A.; Koelle, Alfred R.; and Eckhardt, David A., 4,999,636, Cl. 342-90.000.
Eckhardt, Volker: *See*—
Genz, Joachim; Tresper, Erhard; Idel, Karsten-Josef; Bottenbruch, Ludwig; and Eckhardt, Volker, 4,999,414, Cl. 528-125.000.
Ecolab Inc.: *See*—
Copeland, James L., 4,999,124, Cl. 252-90.000.
Oakes, Thomas R.; Pedersen, Daniel E.; and Majewski, Donna M., 4,999,386, Cl. 523-122.000.
Econocruise Limited: *See*—
Mavadia, Bhaskar; and Scarlett, Jeremy A., 4,999,531, Cl. 310-23.000.
Edelhoff, Gustav D., to Edelhoff Polytechnik GmbH & Co. Parallelepipedic container. 4,998,640, Cl. 220-262.000.
Edelhoff Polytechnik GmbH & Co.: *See*—
Edelhoff, Gustav D., 4,998,640, Cl. 220-262.000.
Eden Tec Corporation: *See*—
Bowman, Bruce R.; Oran, Michael R.; and Syring, Gary J., 4,999,772, Cl. 364-413.050.
Edgar, Richard H.: *See*—
Dudley, Kenneth W.; Edgar, Richard H.; and Eves, E. Eugene, II, 4,999,469, Cl. 219-10.55A.
Edison Polymer Innovation Corporation: *See*—
Cakmak, Mukerrem; and Keuchel, Kenneth, 4,998,663, Cl. 228-2.000.
Edwards, James D.: *See*—
Safran, William M.; and Edwards, James D., 4,998,772, Cl. 297-355.000.
Edwards, Wallace. Printing method and printed product. 4,998,962, Cl. 101-211.000.
Eftink, Aloysius J. Air supply system for an internal combustion engine. 4,998,525, Cl. 123-559.100.
Eggenberger, Edith: *See*—
Eggenberger, Jean-Albert; and Eggenberger, Edith, 4,998,816, Cl. 351-156.000.
Eggenberger, Jean-Albert; and Eggenberger, Edith. Attachment for spectacles. 4,998,816, Cl. 351-156.000.
Eggers, Philip E.; and Thapliyal, Hira V., to Advanced Angioplasty Products, Inc. Thermal angioplasty catheter and method. 4,998,933, Cl. 606-41.000.
Eguchi, Masaharu: *See*—
Shimizu, Masami; Nakashima, Shigeo; Fujiwara, Yutaka; and Eguchi, Masaharu, 4,999,656, Cl. 354-195.120.
Ehrler, Horst, to Kernforschungeszentrum Karlsruhe GmbH. Device for making non-contacting measurements of electric fields which are statical and/or varying in time. 4,999,570, Cl. 324-96.000.
Eigenbrod, Volkmar; and Hendriock, Hans-Jurgen, to Eigenbrod, Volkmar; and Hoechst Aktiengesellschaft. Process for plastic coating, and coating produced by the process. 4,999,221, Cl. 427-195.000.
Eirich, Hubert: *See*—
Durr, Herbert, 4,998,678, Cl. 241-171.000.
Eirich, Paul: *See*—
Durr, Herbert, 4,998,678, Cl. 241-171.000.
Eirich, Walter: *See*—
Durr, Herbert, 4,998,678, Cl. 241-171.000.
Elbl, Karin: *See*—
Staab, Heinz A.; and Elbl, Karin, 4,999,441, Cl. 552-291.000.
Elder, Marlene K. Lid holder rack. 4,998,627, Cl. 211-13.000.
Electric Power Research Institute: *See*—
Nilsson, Stig L., 4,999,565, Cl. 323-210.000.
Electric Power Research Institute, Inc.: *See*—
Ong, Estela T.; Erickson, Diane S.; and Marianowski, Leonard G., 4,999,155, Cl. 419-2.000.
Electro-Nite International N.V.: *See*—
Plessers, Jacques J.; and Maes, Rudi, 4,998,432, Cl. 73-19.070.
Elings, Virgil B., to Digital Instruments, Inc. System for scanning large sample areas with a scanning probe microscope. 4,999,494, Cl. 250-306.000.
Elkins, Robert B.: *See*—
Johansson, Eric B.; Elkins, Robert B.; Crowther, Russell L.; and Matzner, Bruce, 4,999,153, Cl. 376-443.000.
Elledge, Jerry M.: *See*—
Friese, David D.; and Elledge, Jerry M., 4,999,432, Cl. 546-286.000.
Elliott, Raymond; Dalziel, John; and Sunley, Raymond L., to Imperial Chemical Industries PLC. Triazolylmethyl tert-butyl carbinol derivatives which have plant growth regulating properties. 4,999,043, Cl. 71-92.000.
Ellis, William P., Jr., to Dana Corporation. Aluminum driveshaft with balancing composition. 4,998,448, Cl. 74-573.00R.
Elrod, R. Brent. Method of playing a question and answer board game. 4,998,736, Cl. 273-249.000.
Elsbury, Andrew: *See*—
Vink, Timothy; Burkholder, Robert F.; D'Aleo, Michael J.; Elsbury, Andrew; Flowers, Woodie; Lordo, Richard; and McCall, Shawn R., 4,998,635, Cl. 220-3.400.
Emerson Electric Co.: *See*—
Howe, Conrad L., 4,998,430, Cl. 72-335.000.
Emhart Inc.: *See*—
Ainsworth, Steven J. H.; and Dane, Derek R., 4,999,764, Cl. 364-167.010.
Emhart Industries, Inc.: *See*—
Stankosky, Michael J., 4,999,040, Cl. 65-325.000.
Emoto, Kazuhiro; Haino, Kozo; Itoh, Akira; and Okaji, Makoto, to Mitsubishi Paper Mills, Limited. Electrophotographic photoreceptor with bisazo compound. 4,999,269, Cl. 430-58.000.
Emulsan Biotechnologies Inc.: *See*—
Hayes, Michael E., 4,999,195, Cl. 424-114.000.
Engelstad, Barry L.: *See*—
White, David L.; Engelstad, Barry L.; and Muetterties, Kurt A., 4,999,445, Cl. 556-138.000.
Englehart, Gregory R. Preformed unitized closet. 4,998,388, Cl. 52-36.000.
Englert, Heinrich C.; Lang, Hans-Jochen; Mania, Dieter; and Scholkens, Bernward, to Hoechst Aktiengesellschaft. Substituted 3,4-dihydro-2H-benzopyrans, processes for their preparation, their use and pharmaceutical products based on these compounds. 4,999,371, Cl. 514-422.000.
Enomoto, Hiroshi: *See*—
Koishi, Masaru; Yonezawa, Tomoyuki; Enomoto, Hiroshi; and Inoue, Kazushiro, 4,999,003, Cl. 280-103.000.
EOA Systems, Inc.: *See*—
McCormick, Peter E.; and Autry, Walter D., Jr., 4,998,606, Cl. 192-56.00F.

Eppendorf-Netheler-Hinz GmbH: *See*—
Puchinger, Herwig; Gerken, Hero; and Kuhn, Gunther, 4,999,164, Cl. 422-100.000.

Epsztein, Bernard: *See*—
Weisbuch, Claude; and Epsztein, Bernard, 4,999,537, Cl. 313-311.000.

Erb, George H.; and Beard, Susan E., to Erblok Associates. Method for making a hermaphrodite hook and loop fasteners. 4,999,067, Cl. 156-73.100.

Erblok Associates: *See*—
Erb, George H.; and Beard, Susan E., 4,999,067, Cl. 156-73.100.

Erdhuisen, Erwin W. P.: *See*—
Wreesmann, Carel T. J.; and Erdhuisen, Erwin W. P., 4,999,401, Cl. 525-279.000.

Erhardt. Wolfgang, to Dornier Medizintechnik GmbH. Triggering therapeutic shock waves. 4,998,528, Cl. 128-24.00A.

Erickson, Christopher M.: *See*—
Martinez-Leon, Aurelio; Erickson, Christopher M.; and Chen, Pei-Shiun, 4,998,410, Cl. 60-259.000.

Erickson, Diane S.: *See*—
Ong, Estela T.; Erickson, Diane S.; and Marianowski, Leonard G., 4,999,155, Cl. 419-2.000.

Erickson, Mark E.: *See*—
Niksic, Mark R.; and Erickson, Mark E., 4,998,552, Cl. 135-102.000.

Erlenmaier, Gunter; and Spies, Klaus, to Diehl GmbH. Track roller or guide roller for track-laying vehicles. 4,998,783, Cl. 305-56.000.

Erman, Marko: *See*—
Autier, Philippe; Erman, Marko; and Auger, Jean-Marc, 4,999,686, Cl. 357-16.000.

Ernst, Wilbur L. Golf cart cushion. 4,998,311, Cl. 5-455.000.

Eshler, Mark S.; Parisen, Jon D.; and Russell, Martin E., to Saturn Corporation. Wheel trim retention. 4,998,780, Cl. 301-37.00S.

Eskelinen, Paavo, to Noraxon Oy. Signal-shaping network. 4,999,584, Cl. 330-107.000.

Esposito, Gary S. Method of replacing a bolt in work. 4,998,335, Cl. 29-402.060.

Esposito, Joseph R. Three legged workbench frame. 4,998,697, Cl. 248-165.000.

Estee Lauder Inc.: *See*—
Cioca, Gheorghe; Hayward, James A.; Tan, Manuel L.; Herstein, Morris; and Smith, Walter P., 4,999,348, Cl. 514-171.000.

ETA SA Fabriques d'Ebauches: *See*—
Stampfli, Jean-Marcel, 4,999,742, Cl. 361-400.000.

ETA S.A. Fabriques d'Ebauches: *See*—
Grosjean, Laurent, 4,999,823, Cl. 368-295.000.

Etablissements Arrive S.A.: *See*—
Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; and Leclere, Jean, 4,998,322, Cl. 452-71.000.

Etablissements Guyomarc'h S.A.: *See*—
Nguyen, Tan H., 4,999,193, Cl. 424-93.000.

Etherington, Terence; Fletcher, Keith M.; Potts, Rodney M.; and Wade, John R., to Vickers PLC. Printing plate precursors. 4,999,271, Cl. 430-284.000.

Ethicon, Inc.: *See*—
Lunn, Anthony C.; and Mattei, Frank V., 4,999,235, Cl. 428-156.000.

Ethyl Corporation: *See*—
Nelson, Gunner E., 4,999,447, Cl. 556-478.000.
Stahly, G. Patrick, 4,999,429, Cl. 546-21.000.

Etzbach, Karl-Heinz: *See*—
Albert, Bernhard; Etzbach, Karl-Heinz; and Sens, Ruediger, 4,999,026, Cl. 8-471.000.

Etzkorn, William G.: *See*—
Bunning, Donald L.; Etzkorn, William G.; Haydon, William M.; Harkreader, Gordon G.; Kurland, Jonathan J.; Liu, Wai C.; and Vera-Castaneda, Ernesto, 4,999,452, Cl. 560-208.000.

Eurodia S.A.: *See*—
Guerif, Gerard, 4,999,107, Cl. 210-224.000.

European Atomic Energy Community (EURATOM): *See*—
Vansant, Etienne; Peeters, Guido; de Bievre, Paul; and van Gompel, Remi, 4,999,175, Cl. 423-244.000.

Evans, David H., to U.S. Philips Corp. Waveguide oscillator tunable through integrated varactor diode and coupling probe. 4,999,587, Cl. 331-107.0DP.

Evans, Wayne W., to Biotronics Enterprises, Inc. Monitoring system with improved alerting and locating. 4,999,607, Cl. 340-533.000.

Eves, E. Eugene, II: *See*—
Dudley, Kenneth W.; Edgar, Richard H.; and Eves, E. Eugene, II, 4,999,469, Cl. 219-10.55A.

Evstratov, Jury I.; Kononov, Viktor V.; Sandigursky, Oleg L.; Nerovny, Mikhail T.; Larionov, Sergei V.; and Evstratov, Oleg I. Concrete dam bottom discharge works. 4,998,846, Cl. 405-78.000.

Evstratov, Oleg I.: *See*—
Evstratov, Jury I.; Kononov, Viktor V.; Sandigursky, Oleg L.; Nerovny, Mikhail T.; Larionov, Sergei V.; and Evstratov, Oleg I., 4,998,846, Cl. 405-78.000.

Ewan, Frederick R., to Ewan, Frederick R.; and Ozimek, Robert E. Tamper indicating containers and seals. 4,998,666, Cl. 229-102.000.

Exxon Chemical Patents Inc.: *See*—
Datta, Sudhin; and Lohse, David J., 4,999,403, Cl. 525-322.000.
Knaepen, Marc, 4,999,064, Cl. 156-62.200.

Eyquem: *See*—
Wapler, Simone; and Balland, Patrick, 4,999,137, Cl. 252-516.000.

Ezure, Kazuya: *See*—
Wake, Ryousuke; and Ezure, Kazuya, 4,999,258, Cl. 428-632.000.

F. Oberdorfer GmbH & Co. KG Industriegewebe-Technik: *See*—
Vohringer, Fritz, 4,998,568, Cl. 139-383.00A.

Fabian, Alan N.: *See*—
Jannesari, Michael J.; and Fabian, Alan N., 4,999,598, Cl. 335-122.000.

Fabinski, Walter: *See*—
Zoechbauer, Michael; and Fabinski, Walter, 4,999,013, Cl. 356-346.000.

Fadel, Paolo. Oven structure, mainly for cooking of natural and/or deep-frozen and/or pre-cooked food. 4,999,468, Cl. 219-10.55A.

Falk, R. Aaron, to Boeing Company, The. Optoelectric logic array. 4,999,486, Cl. 250-213.00A.

Fankhauser, Peter, to Ciba-Geigy Corporation. Novel pharmaceutical compositions for topical application with systemic action. 4,999,379, Cl. 514-567.000.

Fanuc Ltd.: *See*—
Kawamura, Hideaki; and Fujibayashi, Kentaro, 4,999,784, Cl. 364-474.010.
Seki, Masaki; Samukawa, Koji; and Hanaoka, Osamu, 4,999,765, Cl. 364-191.000.
Yamazaki, Etsuo; and Nagata, Hiroo, 4,999,555, Cl. 318-578.000.

Fanuc Ltd: *See*—
Gamo, Gotaro; and Ishibashi, Tamotsu, 4,999,473, Cl. 219-69.120.

Farago, Frank. Seclusion room bed. 4,998,308, Cl. 5-424.000.

Farberware Inc.: *See*—
Waligorski, Gordon, 4,999,466, Cl. 219-10.55E.

Farbood, Mohamad I.: *See*—
Buckholz, Lawrence, Jr.; Farbood, Mohamad I.; Kossiakoff, Nicolas; and Scharpf, Lewis G., 4,999,207, Cl. 426-536.000.

Farleigh, Scott E.: *See*—
Chen, Hung-San; Farleigh, Scott E.; Helton, John S.; and Larson, Allen L., 4,999,832, Cl. 370-85.140.

Farnsworth, Richard G.: *See*—
Bickford, Dale M.; Farnsworth, Richard G.; Hardy, Samuel G.; Hawley, John R.; and Varney, Albert R., Jr., 4,999,572, Cl. 342-103.00R.

Farnung, H. Peter; Hengst, Alfred; and Keiner, Heinz, to Leica GmbH. Binocular telescopr with radially acting compensating spring. 4,998,357, Cl. 350-556.000.

Farrar, David H., to Velino Ventures Inc. Combustion of liquid hydrocarbons. 4,998,876, Cl. 431-3.000.

Farrell, Larry J. Method for making low resin content polymer concrete. 4,999,396, Cl. 524-650.000.

Fatigati, Charles, to Knittex Fashions, Inc. Feed finger for knitting machines. 4,998,418, Cl. 66-14.000.

Faudi Feinbau GmbH: *See*—
Koch, Paul; and Belz, Klaus, 4,999,108, Cl. 210-243.000.

Feichtiger, Dieter; Holzhauer, Horst; Kneib, Rudi; Polic, Marko; and Weikert, Gunther, to Daimler-Benz AG. Device for coupling and/or uncoupling at least the cores of two cable line sections. 4,998,447, Cl. 74-502.600.

Felder, Bethanne: *See*—
Szekely, Klara; Felder, Bethanne; and Wallace, Lloyd V., 4,999,060, Cl. 136-251.000.

Feldman, Robert D.: *See*—
Austin, Richard F.; Feldman, Robert D.; Sulhoff, James W.; and Zyskind, John L., 4,999,694, Cl. 357-30.000.

Fendley, James R.: *See*—
Adler, Robert; Fendley, James R.; Lange, Howard G.; Prazak, Charles J., III; Steiner, Johann; and Strauss, Paul, 4,998,901, Cl. 445-3.000.

Fenster, Paul: *See*—
Landa, Benzion; and Fenster, Paul, 4,999,677, Cl. 355-273.000.

Ferrari, Claudio: *See*—
Guarneri, Roberto; and Ferrari, Claudio, 4,999,471, Cl. 219-10.55M.

Ferree, Stanley E.: *See*—
Bushey, Roger A.; and Ferree, Stanley E., 4,999,478, Cl. 219-137.0WM.

Ferris, Ernest A. Plastic cage for a one-way clutch. 4,998,605, Cl. 192-41.00A.

Ferro, Antonio. Appetite moderating and anti-gastritis composition. 4,999,341, Cl. 514-33.000.

Ferro, Francesco; and Peruch, Claudio, to Savio S.p.A. Method and device for removing deteriorated fibres during yarn rejoining in an open-end spinning machine. 4,998,404, Cl. 57-263.000.

Ferro, Gregory A., to Imi-Tech Corporation. New articles of manufacture and their production. 4,999,070, Cl. 156-85.000.

Fiasconaro, James G., to Hewlett-Packard Co. Method and apparatus for trimming B-spline descriptions of patches in a high performance three dimensional graphics system. 4,999,789, Cl. 364-518.000.

Fiber Glass Systems, Inc.: *See*—
Ariannejad, Gholamhossein, 4,999,389, Cl. 523-440.000.

Fibro, Inc.: *See*—
Dehne, Wilfried E., 4,998,860, Cl. 414-750.000.

Fichtel & Sachs AG: *See*—
Raab, Harald; Ament, Norbert; and Bernhard, Dieter, 4,998,608, Cl. 192-106.200.

Fidler, Delmer A.: *See*—
Boudakian, Max M.; and Fidler, Delmer A., 4,999,434, Cl. 548-263.200.

Figini, Luigi: *See*—
Paravella, Luciano; and Figini, Luigi, 4,998,857, Cl. 414-331.000.

Fina, Louis R.; Lambert, Jack L.; and Bridges, Ronald L., to Kansas State University Research Foundation. Preparation of Is- polyiodide disinfectant resins. 4,999,190, Cl. 424-79.000.

Fine, John V., Sr.: *See*—
Caputi, Stephen J.; Hobbs, Douglas S.; Pernick, Benjamin J.; Fonneland, Nils J.; and Fine, John V., Sr., 4,998,787, Cl. 350-3.730.
Fink, Anton. High speed chuck apparatus. 4,999,002, Cl. 279-2.00A.
Finley, John: *See*—
Lengerich, Bernhard V.; Haynes, Lynn C.; Levine, Harry; Otterburn, Michael S.; Mathewson, Paul; and Finley, John, 4,999,208, Cl. 426-549.000.
Finney, Clifton D. Golf clubhead with a high polar moment of inertia. 4,999,000, Cl. 273-167.00R.
Fischer, Rich; Silva, Richard; and Welton, Henry P., to Dalgety Produce, Inc. Apparatus for peeling garlic. 4,998,465, Cl. 99-584.000.
Fite, Franklin D., Jr.; and Sparrell, Duncan K., to AT&T Bell Laboratories. Automatic fault recovery in a packet network. 4,999,829, Cl. 370-16.000.
FL Industries Inc.: *See*—
Albritton, Charles W.; and Reagle, Charles D., 4,999,037, Cl. 55-385.100.
Flatley, Doris W.: *See*—
Hsu, Sheng T.; and Flatley, Doris W., 4,999,691, Cl. 357-23.700.
Fleet, George W. J.; Rademacher, Thomas W.; and Dwek, Raymond A., to Monsanto Company. Method of inhibiting virus. 4,999,360, Cl. 514-315.000.
Fletcher, John: *See*—
Aitken, John; and Fletcher, John, 4,998,492, Cl. 112-303.000.
Fletcher, Keith M.: *See*—
Etherington, Terence; Fletcher, Keith M.; Potts, Rodney M.; and Wade, John R., 4,999,271, Cl. 430-284.000.
Float Machines Inc.: *See*—
Buchanan, Bradley H., 4,999,081, Cl. 156-515.000.
Flomat Limited: *See*—
Poulton, Barrie A., 4,998,991, Cl. 222-181.000.
Flowers, Woodie: *See*—
Vink, Timothy; Burkholder, Robert F.; D'Aleo, Michael J.; Elsbury, Andrew; Flowers, Woodie; Lordo, Richard; and McCall, Shawn R., 4,998,635, Cl. 220-3.400.
Floyd, Roger M.: *See*—
McElhaney, William L.; Floyd, Roger M.; and Duncan, Farris N., 4,998,667, Cl. 229-120.370.
FMC Corporation: *See*—
Le Devehat, Eugene, 4,998,560, Cl. 137-616.000.
Foate, Richard A. Toddler meal processor. 4,998,348, Cl. 30-114.000.
Fogarty, Thomas J.: *See*—
Chin, Albert K.; Nobles, Anthony A.; and Lai, Kwok Y., 4,998,972, Cl. 128-6.000.
Foglesonger, John D.; and Vranson, David M., to ITT Corporation. Heat exchanger. 4,998,584, Cl. 165-171.000.
Foltz, Carl L., to Halkey-Roberts Corporation. Flow control valve. 4,998,562, Cl. 137-877.000.
Fong, Dodd W., to Nalco Chemical Company. N-dibenzosuberenylacrylamide (N-5-(5H-dibenzo[a,d]cycloheptenyl)acrylamide). 4,999,456, Cl. 564-207.000.
Fong, Dodd W.: *See*—
Pierce, Claudia C.; Grattan, David A.; and Fong, Dodd W., 4,999,161, Cl. 422-12.000.
Fonneland, Nils J.: *See*—
Caputi, Stephen J.; Hobbs, Douglas S.; Pernick, Benjamin J.; Fonneland, Nils J.; and Fine, John V., Sr., 4,998,787, Cl. 350-3.730.
Fontana, Edward C.; and Rucki, John S., to AT&T Bell Laboratories. Transformer with included current sensing element. 4,999,743, Cl. 361-400.000.
Fonzi, Frank: *See*—
Foster, Bryan D.; and Fonzi, Frank, 4,998,879, Cl. 432-253.000.
Food Forming Corporation: *See*—
Lortz, James L., 4,999,206, Cl. 426-512.000.
Foodcraft Equipment Co.: *See*—
Martin, Eugene; Martin, Harold; and Lease, Michael E., 4,998,323, Cl. 452-125.000.
Ford, Christopher. Carpet gripping device for use under an overlayed floor covering. 4,998,319, Cl. 16-8.000.
Ford Motor Company: *See*—
Soltis, Michael W.; and Mackool, Sam M., 4,999,776, Cl. 364-424.050.
Ford New Holland, Inc.: *See*—
Diederich, Anthony F., Jr., 4,998,469, Cl. 100-2.000.
Forney, Edgar W.; Gabany, Andrew J.; and Smith, Tracy L., to AMP Incorporated. Packaged electrical connector. 4,998,895, Cl. 439-585.000.
Forrer, Larry L.: *See*—
Wheadon, Ellis G.; and Forrer, Larry L., 4,998,340, Cl. 29-623.100.
Foshee, Carolyn S., executrix: *See*—
Borgmann, James W.; and Foshee, William R., deceased, 4,998,422, Cl. 70-38.00A.
Foshee, William R., deceased: *See*—
Borgmann, James W.; and Foshee, William R., deceased, 4,998,422, Cl. 70-38.00A.
Foster, Bryan D.; and Fonzi, Frank, to Norton Company. High purity diffusion furnace components. 4,998,879, Cl. 432-253.000.
Foster Wheeler USA Corporation: *See*—
Banquy, David L., 4,999,133, Cl. 252-373.000.
Skinner, Geoffrey F.; and Kowal, Wieslaw M., 4,999,030, Cl. 48-197.00R.
Foust, Donald F.; and Dumas, William V., to General Electric Company. Method for treating polyetherimide substrates and articles obtained therefrom. 4,999,251, Cl. 428-458.000.
Foust, Gregory B., to Eastman Kodak Company. Automatic exposure control apparatus for daylight/underwater camera. 4,999,664, Cl. 354-446.000.
Fowler, James E., to Milliken Research Corporation. Method and product to enhance electrical conductivity of films containing conductive carbon black. 4,999,231, Cl. 428-95.000.
Fox, Alfred E.; and Boulton, James B. Hoofed-animal shoe pad. 4,998,586, Cl. 168-12.000.
Framatome: *See*—
Petit, Bernard, 4,999,154, Cl. 376-446.000.
Francomano, David M.: *See*—
Kremer, Russell E.; and Francomano, David M., 4,999,082, Cl. 156-605.000.
Franke, Norman C.: *See*—
Irwin, Gregory D.; and Franke, Norman C., 4,998,516, Cl. 123-198.00E.
Franz Klaus Union Armaturen Pumpen GmbH & Co.: *See*—
Klaus, Franz, 4,998,863, Cl. 417-63.000.
Frassek, Karl-Heinz: *See*—
Kuhne, Helmut; Frassek, Karl-Heinz; Sonderhof, Dieter; Lanzrath, Gunther; Steinseifer, Fritz; and Beck, Heinz, 4,999,400, Cl. 525-196.000.
Fray, Derek J., to Metallurg, Inc. Transporting a liquid past a barrier. 4,999,092, Cl. 204-68.000.
Frazita, Richard F.; and Lopez, Alfred R., to Hazeltine Corporation. Radome having integral heating and impedance matching elements. 4,999,639, Cl. 343-704.000.
Fred Hutchinson Cancer Research Center: *See*—
Slichter, Sherrill J.; and Deeg, H. Joachim, 4,998,931, Cl. 604-20.000.
Freeman, Glenn E.; Valimont, James L.; Dunaway, James H.; and Korenkiewicz, Karen J., to PPG Industries, Inc. Automotive windshield for a head up display system. 4,998,784, Cl. 350-3.700.
Freepons, Donald, to Canbra Foods Ltd. Method for reducing pesticide drift. 4,999,048, Cl. 71-118.000.
Frentzel- Beyme, Johannes, to Palitex Project Company GmbH. Two-for-one twisting machine. 4,998,405, Cl. 57-279.000.
Freund, Peter: *See*—
Tsaklakidis, Christos; Leinert, Herbert; and Freund, Peter, 4,999,361, Cl. 514-333.000.
Fridjhon, Michael. Wine rack. 4,998,631, Cl. 211-74.000.
Friederichs, Winand H. A. M.: *See*—
Lapre, Marcella A.; and Friederichs, Winand H. A. M., 4,999,538, Cl. 313-318.000.
Friese, David D.; and Elledge, Jerry M., to DowElanco. Fluorination with hydrogen fluoride. 4,999,432, Cl. 546-286.000.
Friesem, Asher A.; and Amitai, Yaakov, to Yeda Research and Development Co. Ltd.; and Weizman Institute of Science, The. Method of producing holograms particularly for holographic helmet displays. 4,998,786, Cl. 350-3.700.
Frigerio, Marco: *See*—
Gandolfi, Carmelo A.; Frigerio, Marco; Spinelli, Silvano; Tofanetti, Odoardo; and Tognella, Sergio, 4,999,362, Cl. 514-334.000.
Froloff, Philip P., to Unisys Corporation. High density low reactance socket. 4,999,023, Cl. 439-68.000.
Frostad, Joseph R. Piggy deck. 4,998,506, Cl. 119-18.000.
Fruchey, Olan S., to Hoechst Celanese Corporation. Process for the synthesis of 3-chloro-4-hydroxyacetanilide. 4,999,457, Cl. 564-223.000.
Frye, Cecil L.: *See*—
Weiss, Keith D.; and Frye, Cecil L., 4,999,397, Cl. 524-755.000.
Fu, Ta-Wei; and Katz, Manfred, to Conoco Inc. Process for making mesophase pitch. 4,999,099, Cl. 208-39.000.
Fu, Ta-Wei: *See*—
Griffin, Robert R.; Roussel, Keith M.; and Fu, Ta-Wei, 4,998,709, Cl. 264-29.500.
Fuchs, Donald C., Jr., to Mr. Coffee, Inc. Microwavable coffee maker. 4,999,470, Cl. 219-10.55E.
Fuchs, Hubert: *See*—
Wiest, Peter P.; and Fuchs, Hubert, 4,998,914, Cl. 604-67.000.
Fudono, Kanji; Ogawa, Hiroshi; Takahashi, Toshimasa; and Yamashita, Toshio, to Mitsubishi Jukogyo Kabushiki Kaisha. Refrigerator system for a container. 4,998,582, Cl. 165-11.100.
Fuehrer, Reece R., to General Motors Corporation. Planet carrier assembly. 4,998,909, Cl. 475-331.000.
Fueki, Shunsuke: *See*—
Maruyama, Shigeru; Fueki, Shunsuke; Kitajima, Hironobu; and Kiuchi, Takashi, 4,999,487, Cl. 250-216.000.
Fuhrer, Gerd; and Heinzelmann, Karl-Fritz, to Zahnradfabrik Friedrichshafen AG. Oil lubrication system for the bearing of a shaft journal. 4,998,600, Cl. 184-6.100.
Fuji Electric Co., Ltd.: *See*—
Nakanishi, Shingo; and Yamamoto, Susumu, 4,998,865, Cl. 417-423.700.
Nishiura, Masaharu; and Yamada, Katsumi, 4,999,308, Cl. 437-4.000.
Fuji, Hiroshi; Maeda, Shigemi; Sakamoto, Noriaki; Terashima, Shigeo; Yamaguchi, Takeshi; Tsuji, Kentaro; and Kojima, Kunio, to Sharp Kabushiki Kaisha. Magneto-optical memory device. 4,999,824, Cl. 369-13.000.
Fuji Jukogyo Kabushiki Kaisha: *See*—
Kobayashi, Tomoya, 4,998,519, Cl. 123-333.000.
Muraoka, Kunihiko, 4,999,775, Cl. 364-424.030.

Yasuge, Katsumi, 4,999,475, Cl. 219-86.410.
Fuji Kiko Company: *See*—
Yuzuriha, Naoki; and Yamamoto, Yoshimi, 4,998,999, Cl. 280-777.000.
Fuji Photo Film Co., Ltd.: *See*—
Fukushima, Osamu, 4,999,667, Cl. 355-28.000.
Funahashi, Takeshi; and Tanaka, Hiroshi, 4,999,497, Cl. 250-327.200.
Hasegawa, Akira, 4,999,273, Cl. 430-138.000.
Inagaki, Yoshio; Adachi, Keiichi; and Yabe, Masao, 4,999,281, Cl. 430-495.000.
Kakuda, Tunenari, 4,999,733, Cl. 361-213.000.
Kasama, Yasuo; and Inoue, Nobuaki, 4,999,275, Cl. 430-264.000.
Kuwabara, Ken-ichi; Ishigaki, Kunio; and Inayama, Takayuki, 4,999,276, Cl. 430-264.000.
Nakamura, Takashi; and Takahashi, Kenji, 4,999,515, Cl. 250-484.100.
Suzuki, Kenji; and Nakamura, Hiroaki, 4,999,668, Cl. 355-38.000.
Tozaki, Katutoshi; and Nakayama, Yoshiaki, 4,999,719, Cl. 360-35.100.
Usami, Toshimasa; Hatakeyama, Seiji; Shimomura, Akihiro; and Iwakura, Ken, 4,999,333, Cl. 503-209.000.
Fuji Xerox Co., Ltd.: *See*—
Ojima, Fumio; Mashimo, Kiyokazu; Hozumi, Masahiko; Hoshizaki, Taketoshi; and Nakamura, Kazuyuki, 4,999,268, Cl. 430-59.000.
Fujibayashi, Kazuo: *See*—
Shiraishi, Akihiko; Fujibayashi, Kazuo; and Kato, Masatake, 4,998,801, Cl. 350-162.200.
Fujibayashi, Kentaro: *See*—
Kawamura, Hideaki; and Fujibayashi, Kentaro, 4,999,784, Cl. 364-474.010.
Fujii, Eiichi: *See*—
Saito, Ichiro; Osato, Yoichi; Fujii, Eiichi; and Arao, Kozo, 4,999,260, Cl. 428-694.000.
Fujii, Setsuro; Kawamura, Hiroyuki; and Watanabe, Shinichi, to Otsuka Pharmaceutical Company, Limited. Phenylcarboxylic acid derivatives. 4,999,378, Cl. 514-567.000.
Fujii, Yasuhiro: *See*—
Kanda, Minoru; Komatsu, Mikio; Fujii, Yasuhiro; Abiko, Toshio; Masamoto, Kyoji; Ogawa, Yasumasa; and Hashimoto, Tuyoshi, 4,999,592, Cl. 333-26.000.
Fujikawa, Yukiharu: *See*—
Okimoto, Satoshi; Fujikawa, Yukiharu; Otsuka, Naoki; and Sato, Miyuki, 4,998,832, Cl. 400-76.000.
Fujisawa, Katsuya: *See*—
Nishida, Yasuaki; Fujisawa, Katsuya; Fujita, Yoshihiro; Fujiwara, Masao; Yoshikawa, Shigeo; and Uetsuki, Masao, 4,998,800, Cl. 350-162.200.
Fujita, Teruo, to Mitsubishi Denki K.K. Focused-spot-position detection device for optical information recording and reproducing device. 4,999,826, Cl. 369-44.410.
Fujita, Yoshihiro: *See*—
Nishida, Yasuaki; Fujisawa, Katsuya; Fujita, Yoshihiro; Fujiwara, Masao; Yoshikawa, Shigeo; and Uetsuki, Masao, 4,998,800, Cl. 350-162.200.
Fujitsu Limited: *See*—
Aoki, Tetsuo; and Asami, Fumitaka, 4,999,708, Cl. 358-153.000.
Hamano, Toshio; and Natsume, Shigeo, 4,999,319, Cl. 437-209.000.
Ishikawa, Kouji; Kawano, Kyoichiro; Murase, Teruo; Sochor, Jerzy R.; and Norman, C. Timothy, 4,998,884, Cl. 439-49.000.
Katsuno, Akira, 4,999,801, Cl. 364-748.000.
Kitajima, Hironobu, 4,998,823, Cl. 356-356.000.
Maruyama, Shigeru; Fueki, Shunsuke; Kitajima, Hironobu; and Kiuchi, Takashi, 4,999,487, Cl. 250-216.000.
Nakatani, Tetsuji; and Watanabe, Akira, 4,999,596, Cl. 333-204.000.
Ueda, Ryuichi; Nakamura, Masaaki; Iwasaki, Toshio; Hirota, Kanji; and Nakamura, Tetsuya, 4,999,614, Cl. 340-588.000.
Fujiwara, Hideaki, to Tanaka Seimitu Kogyo Kabushiki Kaisha. Synchronizer ring. 4,998,445, Cl. 74-339.000.
Fujiwara, Kenichi: *See*—
Sato, Hideaki; Nagashima, Hisao; Fujiwara, Kenichi; and Kitamura, Keiichi, 4,998,413, Cl. 62-149.000.
Fujiwara, Masao: *See*—
Nishida, Yasuaki; Fujisawa, Katsuya; Fujita, Yoshihiro; Fujiwara, Masao; Yoshikawa, Shigeo; and Uetsuki, Masao, 4,998,800, Cl. 350-162.200.
Fujiwara, Masatsugu: *See*—
Tanikawa, Hirohide; Nakahara, Toshiaki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Sakashita, Kiichiro, 4,999,272, Cl. 430-106.600.
Fujiwara, Ryuhei, to NEC Corporation. ISDN network termination unit enabling to establish data link between one terminal equipment and other terminal equipments connected to the unit without use of subscriber line. 4,999,836, Cl. 370-110.100.
Fujiwara, Toshihiro: *See*—
Kamitani, Masatoshi; and Fujiwara, Toshihiro, 4,999,658, Cl. 354-225.000.
Fujiwara, Yukihiko: *See*—
Minoura, Norihiko; Aiba, Seiichi; and Fujiwara, Yukihiko, 4,999,297, Cl. 435-240.230.
Fujiwara, Yutaka: *See*—
Shimizu, Masami; Nakashima, Shigeo; Fujiwara, Yutaka; and Eguchi, Masaharu, 4,999,656, Cl. 354-195.120.
Fukahori, Hidehiko; Suzuki, Masayuki; and Aihara, Yoshihiko, to Canon Kabushiki Kaisha. Motor driven camera. 4,999,655, Cl. 354-173.100.
Fukahori, Hidehiko; and Matsuda, Mutsuhide, to Canon Kabushiki Kaisha. Connector device for a camera. 4,999,659, Cl. 354-286.000.
Fukuda, Kenji; and Kazama, Yasuo, to Nitto Kohki Co., Ltd. Reciprocating tool. 4,998,353, Cl. 30-392.000.
Fukunaga, Taizou: *See*—
Chida, Shohei; Kozaki, Masami; Asahi, Toshinori; Ono, Chiyoaki; Iwasa, Seiji; Fukunaga, Taizou; and Takemura, Moriyuki, 4,998,776, Cl. 299-59.000.
Fukunishi, Souhei, to Kabushiki Kaisha Toshiba. Electronic endoscope apparatus capable of observing laser-illuminated biological body portion. 4,998,971, Cl. 128-6.000.
Fukushima, Osamu, to Fuji Photo Film Co., Ltd. Method of controlling drying in photographic processing apparatus. 4,999,667, Cl. 355-28.000.
Fukushima, Tetsuo; Otsuki, Toshinori; Okada, Shinji; and Seutsugu, Kenichiro, to Matsushita Electric Industrial Co., Ltd. Method of molding a lens array. 4,999,142, Cl. 264-1.700.
Fukutome, Susumu: *See*—
Moritani, Tohei; Fukutome, Susumu; Motoishi, Yasuo; and Oda, Hidemasa, 4,999,229, Cl. 428-36.600.
Fukuyasu, Shigeki; Nakamura, Makoto; Kawachi, Kyozo; Yamaguchi, Seiji; Kinoshita, Sakan; and Numata, Tadashi, to Ichibiki Co., Ltd.; Kabushiki Kaisha Toshiba; and Shibaura Engineering Works Co., Ltd. Method for producing miso. 4,999,203, Cl. 426-46.000.
Fukuzawa, Sooichi; and Yano, Kazuyuki, to Hitachi, Ltd. Drainage pump. 4,998,861, Cl. 415-206.000.
Fuller, Kip L.: *See*—
Williamson, Lon A.; Pennypacker, Frank C.; Collier, Donald W.; and Fuller, Kip L., 4,999,613, Cl. 340-573.000.
Funahashi, Takeshi; and Tanaka, Hiroshi, to Fuji Photo Film Co., Ltd. Radiation image read-out and reproducing method and apparatus. 4,999,497, Cl. 250-327.200.
Funahashi, Yoshiki; Matsumoto, Nobuo; and Shiraki, Keita, to Tokai Rubber Industries, Ltd. Method of manufacturing fluid-filled elastic mount having pressure-receiving and equilibrium chambers. 4,998,345, Cl. 29-897.200.
Funakubo, Tomoki; Hakamatsuka, Yasuharu; Aihara, Mamoru; Watanabe, Kazuhiro; Koshiishi, Kiyozou; and Shigetomi, Sadao, to Olympus Optical Co., Ltd. Dental centrifugal casting apparatus. 4,998,872, Cl. 425-143.000.
Funamoto, Akihiko: *See*—
Sato, Masayuki; Kobayashi, Noriyuki; Funamoto, Akihiko; and Kataoka, Yoshitoshi, 4,999,442, Cl. 556-14.000.
Funayama, Yoshiyuki: *See*—
Ishiwata, Shinichi; Ueyama, Michio; Nakae, Hiroyuki; Funayama, Yoshiyuki; Iwamoto, Kazushige; and Noguchi, Isamu, 4,999,242, Cl. 428-345.000.
Furst, Arpad: *See*—
Schreiter, Thomas; Reihl, Peter; Miklosi, Stefan; Reinsch, Burkhard; Wingen, Bernhard; Patz, Werner; and Furst, Arpad, 4,998,771, Cl. 296-217.000.
Furtmayr, Joachim: *See*—
Rudenauer, Werner; Muller, Fritz; and Furtmayr, Joachim, 4,998,476, Cl. 102-226.000.
Furukawa Aluminum Co., Ltd.: *See*—
Yamanoi, Yukio; Kandachi, Mitsuo; Iwata, Masahiro; and Kato, Kazumi, 4,998,429, Cl. 72-283.000.
Furukawa Electric Co., Ltd.: *See*—
Ishiwata, Shinichi; Ueyama, Michio; Nakae, Hiroyuki; Funayama, Yoshiyuki; Iwamoto, Kazushige; and Noguchi, Isamu, 4,999,242, Cl. 428-345.000.
Furuya, Masato: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Suzuki, Tetsuji, 4,999,712, Cl. 358-213.110.
Fushimi, Tomohisa: *See*—
Shimizu, Takeshi; Saito, Kenji; Fushimi, Tomohisa; Huemann, Gisela; and Gonzales, Jose M., 4,998,770, Cl. 296-37.800.
Gabany, Andrew J.: *See*—
Forney, Edgar W.; Gabany, Andrew J.; and Smith, Tracy L., 4,998,895, Cl. 439-585.000.
Gach, Alain: *See*—
Costes, Michel; Gach, Alain; Hartmann, Yves; and Peyronnenc, Michel, 4,999,769, Cl. 364-200.000.
Gadras, Alain; and Pepin, Regis, to Rhone-Poulenc Agrochimie. 2-(3-pyridyl)-3-(phenoxy)-propanenitrile derivatives having fungicidal activity. 4,999,357, Cl. 514-277.000.
Gaffney, Thomas E.; Klessig, Clarence E.; Weir, Alan J.; and Grycan, Stanley M., to Kohler Co. Handle assembly. 4,998,321, Cl. 16-110.00R.
Gagnon, James J., to J-W Operating Company. 4-stroke, stratified gas engine. 4,998,513, Cl. 123-76.000.
Gaiser, John W.; and Balogun, Abdul-Razaq A., to Advanced Cardiovascular Systems, Inc. High torque steerable dilatation catheter. 4,998,917, Cl. 604-96.000.
Gajek, Ryszard: *See*—
Pohl, Christopher; Slingsby, Roseanne W.; Stillian, John R.; and Gajek, Ryszard, 4,999,098, Cl. 204-301.000.
Gallaher, Harold D. Machine for shaving ice. 4,998,677, Cl. 241-95.000.
Gallant, Thomas M. Golf tee. 4,998,732, Cl. 273-212.000.
Gallichan R. & Ass., Inc.: *See*—
Gallichan, Rejean, 4,998,498, Cl. 114-345.000.
Gallichan, Rejean, to Gallichan R. & Ass., Inc. Knockdown sailboat. 4,998,498, Cl. 114-345.000.
Galliher, Parrish M., to Biogen, N.V. Continuous method of refolding proteins. 4,999,422, Cl. 530-351.000.

Galomb, David E. Screen for burglar alarms and method of making the same. 4,999,608, Cl. 340-550.000.
Gammache, Richard J. Flashlight with rotatable head assembly. 4,999,750, Cl. 362-203.000.
Gamo, Gotaro; and Ishibashi, Tamotsu, to Fanuc Ltd. Automatic wire threading method. 4,999,473, Cl. 219-69.120.
Gandolfi, Carmelo A.; Frigerio, Marco; Spinelli, Silvano; Tofanetti, Odoardo; and Tognella, Sergio, to Boehringer Biochemia Robin S.p.A. 2-thiomethyl-substituted-1,4-dihydropyridines, method for their preparation and pharmaceutical compositions containing them. 4,999,362, Cl. 514-334.000.
Ganguly, Ashit K.: *See*—
Saksena, Anil K.; Girijavallabhan, Viyyoor M.; and Ganguly, Ashit K., 4,999,428, Cl. 544-277.000.
Garenfeld, Andreas J.: *See*—
Wolfs, Marc J. M.; and Garenfeld, Andreas J., 4,998,460, Cl. 92-162.00R.
Garner, Harold E.; Miller, Merrill M.; Kavanagh, Brian E.; and Spring, Gorden W., to Universal Product Innovations, Inc. Toppling toy. 4,998,902, Cl. 446-2.000.
Garrigue, Roger; and Lalo, Jack, to Norsolor S.A. Acrylic derivative of urea. 4,999,455, Cl. 564-59.000.
Garvey, Charles C., Jr.: *See*—
Mouton, William J.; Grush, Robert; and Alton, Dolores B., 4,998,844, Cl. 405-21.000.
Gary, Lonnie F., to Gary Products Group, Inc. Decorative sconce assembly. 4,999,754, Cl. 362-237.000.
Gary Products Group, Inc.: *See*—
Gary, Lonnie F., 4,999,754, Cl. 362-237.000.
Gary, Richard A.: *See*—
Klinedinst, Keith A.; and Gary, Richard A., 4,999,219, Cl. 427-69.000.
Gas Desulfurization Corporation: *See*—
Wilson, William G.; and Kay, D. Alan R., 4,999,174, Cl. 423-241.000.
Gas Metropolitain Inc.: *See*—
Bose, Tapan K.; Chahine, Richard; and St-Arnaud, Jean-Marie, 4,999,330, Cl. 502-402.000.
Gaske, Joseph; Krajewski, John J.; and Noren, Gerry K., to DeSoto, Inc. Method of coating concrete floors with photocurable coatings. 4,999,216, Cl. 427-44.000.
Gasper, John; Kulpinski, Robert W.; and Lubinsky, Anthony R., to Eastman Kodak Company. Transparent radiation image storage panel. 4,999,505, Cl. 250-484.100.
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Townsend, Blue H., 4,998,651, Cl. 223-101.000.
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Gawin, Irena, to Hercules Incorporated. Damage tolerant composites containing infusible particles. 4,999,238, Cl. 428-283.000.
Gaynor, Michael P., to Motorola, Inc. Bifilar planar inductor. 4,999,597, Cl. 333-246.000.
GDS Technology, Inc.: *See*—
deCastro, Aurora F.; Gupta, Surendra K.; and Shantz, Steven M., 4,999,288, Cl. 435-18.000.
Geiger, Robert A. Cover assembly for a ground opening. 4,998,387, Cl. 52-20.000.
Gelb, George H.: *See*—
Haddock, Loren B.; Ballinger, Bruce D.; and Gelb, George H., 4,999,277, Cl. 430-269.000.
Gemcor Engineering Corporation: *See*—
Roberts, Bradley M.; and Birke, James L., 4,998,943, Cl. 29-432.200.
Genakis, Joseph M. Cylinder lock. 4,998,426, Cl. 70-494.000.
General Devices Co., Inc.: *See*—
Hobbs, James D., 4,998,828, Cl. 384-18.000.
General Dynamics Corporation: *See*—
Bhatt, Surendra J., 4,999,499, Cl. 250-342.000.
General Electric Company: *See*—
Bellino, Joseph P.; Arnold, David; O'Brien, Dexter T.; and Goldman, Ira B., 4,999,464, Cl. 200-267.000.
Bickford, Dale M.; Farnsworth, Richard G.; Hardy, Samuel G.; Hawley, John R.; and Varney, Albert R., Jr., 4,999,572, Cl. 342-103.00R.
D'Antonio, Michael J.; Gibbs, Irving A.; Lane, Lawrence J.; and Lawson, Rodney A., 4,999,564, Cl. 322-99.000.
Foust, Donald F.; and Dumas, William V., 4,999,251, Cl. 428-458.000.
Germer, Warren R., 4,999,575, Cl. 324-142.000.
Gou, Perng-Fei; and Townsend, Harold E., 4,998,509, Cl. 122-504.000.
Hsu, Sheng T.; and Flatley, Doris W., 4,999,691, Cl. 357-23.700.
Johansson, Eric B.; Elkins, Robert B.; Crowther, Russell L.; and Matzner, Bruce, 4,999,153, Cl. 376-443.000.
Levinson, Lionel M., 4,999,576, Cl. 324-142.000.
Okamoto, Kevin T., 4,999,388, Cl. 523-400.000.
Roberts, Daniel L.; and Willard, G. Fred, 4,999,384, Cl. 521-134.000.
Rosenquist, Niles R., 4,999,408, Cl. 525-463.000.
Temple, Victor A. K., 4,999,684, Cl. 357-13.000.
General Electric Company, p.l.c., The: *See*—
Tyler, Stephen G., 4,999,741, Cl. 361-387.000.
General Engineering (Netherlands) B.V.: *See*—
Skanberg, Enar T.; and Axelsson, Lars B., 4,999,004, Cl. 297-480.000.
General Motors Corporation: *See*—
Bayer, Dean M.; Harris, Curtis H.; and Jones, Bradley A., 4,998,761, Cl. 293-121.000.
Derrick, Dennis D., 4,998,950, Cl. 60-562.000.
Fuehrer, Reece R., 4,998,909, Cl. 475-331.000.
Gokhale, Kalyan P., 4,998,526, Cl. 123-598.000.
Holl, William H.; and Wang, Wei-Ming, 4,999,781, Cl. 364-431.050.
Johnson, Roger E.; Jensen, Thomas C.; VanRossen, Edward C.; and O'Donnell, Kevin M., 4,998,769, Cl. 296-183.000.
Kowalczyk, David; Dow, Ian J.; and May, Carl D., 4,998,758, Cl. 292-201.000.
Meyer, Karen M.; Liggett, Michael D.; Conklin, Robert J.; and Barker, Charles J., 4,998,707, Cl. 251-129.150.
Rechenbach, William S., 4,998,428, Cl. 72-40.000.
Thatcher, David A.; and Tierney, Gordon L., 4,998,782, Cl. 303-110.000.
Vukovich, William J.; and Yu, Tsunlock A., 4,998,604, Cl. 192-3.300.
Yamamoto, Mayjue A., 4,998,602, Cl. 188-328.000.
Gentner, Jean-Louis; Patillon, Jean-Noel; Mallet-Mouko, Catherine; and Martin, Gerard, to U.S. Philips Corporation. PIN photodiode having a low leakage current. 4,999,696, Cl. 357-30.000.
Genz, Joachim; Tresper, Erhard; Idel, Karsten-Josef; Bottenbruch, Ludwig; and Eckhardt, Volker, to Bayer Aktiengesellschaft. Process for the production of aromatic polyether ketones. 4,999,414, Cl. 528-125.000.
Georgia-Pacific Corporation: *See*—
McElhaney, William L.; Floyd, Roger M.; and Duncan, Farris N., 4,998,667, Cl. 229-120.370.
Geren, William P.: *See*—
Koslover, Robert A.; Cremer, Charles D.; Geren, William P.; Voss, Donald E.; and Miner, Lynn M., 4,999,591, Cl. 333-21.00R.
Gerhard, Paul: *See*—
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Gerhard, Paul; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,999,045, Cl. 71-92.000.
Gerhards, Hermann J.: *See*—
Kampe, Klaus-Dieter; Usinger, Patricia; Siegel, Herbert; Alpermann, Hans G.; and Gerhards, Hermann J., 4,999,352, Cl. 514-235.800.
Gerhardt, Wolfgang; and Hefner, Werner, to BASF Aktiengesellschaft. Removing CO_2 and, if necessary, H_2S from gases. 4,999,031, Cl. 55-43.000.
Gerken, Hero: *See*—
Puchinger, Herwig; Gerken, Hero; and Kuhn, Gunther, 4,999,164, Cl. 422-100.000.
Germer, Warren R., to General Electric Company. Power supply and monitor for controlling an electrical load following a power outage. 4,999,575, Cl. 324-142.000.
Gervais, Michel, to Schlumberger Industries. Memory card read/write device provided with an anti-fraud device. 4,999,601, Cl. 235-492.000.
Gervais, Michel: *See*—
Dumoulin, Andre; and Gervais, Michel, 4,999,148, Cl. 264-174.000.
Geusz, Steven D.; and Anderson, David M. Bacteria that metabolize phenylacetate through mandelate. 4,999,292, Cl. 435-172.100.
Geyer, Gerhard; Mendle, Johann; and Dillmann, Hermann-Josef, to Robert Bosch GmbH. Injection timing adjuster for internal combustion engines. 4,998,523, Cl. 123-502.000.
Ghadjar, Fathali G.: *See*—
Ghajar, Jamshid B. G.; Ghadjar, Fathali G.; and Hariri, Robert J., 4,998,938, Cl. 606-130.000.
Ghajar, Jamshid B. G.; Ghadjar, Fathali G.; and Hariri, Robert J., to Neurodynamics, Inc. Removable skull mounted work platform and method of assembling same. 4,998,938, Cl. 606-130.000.
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Croman, Robert B.; Ghorashi, Hamid M.; and Singh, Gurdial, 4,999,395, Cl. 524-607.000.
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Brufani, Mario; Ceccarelli, Stefano; Giannetti, Patrizia; Paesano, Agnese; Scuri, Romolo; and Zanarella, Sergio, 4,999,350, Cl. 514-210.000.
Giardina, Giuseppe: *See*—
Vecchietti, Vittorio; and Giardina, Giuseppe, 4,999,359, Cl. 514-301.000.
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D'Antonio, Michael J.; Gibbs, Irving A.; Lane, Lawrence J.; and Lawson, Rodney A., 4,999,564, Cl. 322-99.000.
Gibson, Owen E.; Gleeson, William J.; Burkholder, Larry D.; and Benton, Bradley K., to Hughes Aircraft Company. Bond signature analyzer. 4,998,664, Cl. 228-102.000.
Gibson, Royce G., to Tendapak Technologies Pty. Ltd. Helically shaped meat product. 4,999,204, Cl. 426-104.000.
Gilch, Heinz G.; and Albert, Karl-Heinz, to Bostik, Inc. Hot-melt polyurethane adhesive compositions. 4,999,407, Cl. 525-457.000.
Girardelli, Helmut, to Aluxa AG. Size-adjustable ski boot. 4,998,358, Cl. 36-117.000.
Giraud, Laurent: *See*—
Bordaz, Pascal; Giraud, Laurent; Monnier, Alain; and Prus, Eric, 4,998,672, Cl. 239-585.000.
Girijavallabhan, Viyyoor M.: *See*—
Saksena, Anil K.; Girijavallabhan, Viyyoor M.; and Ganguly, Ashit K., 4,999,428, Cl. 544-277.000.
Gleason, Robert E., Jr.: *See*—
Cham, Kit M.; and Gleason, Robert E., Jr., 4,999,523, Cl. 307-570.000.

Gleeson, William J.: *See—*
Gibson, Owen E.; Gleeson, William J.; Burkholder, Larry D.; and Benton, Bradley K., 4,998,664, Cl. 228-102.000.

Glen, Alasdair T.: *See—*
Crowley, Patrick J.; Glen, Alasdair T.; and Spence, Rosamund A., 4,999,381, Cl. 514-618.000.

Glisson, John R.; and Hofacre, Charles L., to University of Georgia Research Foundation, Inc. *Pasteurella multocida* vaccine. 4,999,191, Cl. 424-92.000.

Glover, John E. S.; and Glover, Timothy N., to Thermabate Limited. Panel support structure. 4,998,390, Cl. 52-95.000.

Glover, Richard D., to R.G.S. Pattern Book Co. Limited. Color indicating devices. 4,998,882, Cl. 434-98.000.

Glover, Timothy N.: *See—*
Glover, John E. S.; and Glover, Timothy N., 4,998,390, Cl. 52-95.000.

Gnekow, Barry R., to Ariel Vineyards, Inc. Low and non-alcoholic beverages produced by simultaneous double reverse osmosis. 4,999,209, Cl. 426-592.000.

Godfrey, Christopher R. A.: *See—*
Anthony, Vivienne M.; Clough, John M.; Godfrey, Christopher R. A.; and Wiggins, Thomas E., 4,999,042, Cl. 71-88.000.

Goebbels, Hans R.; Biermann, Kurt; Steppat, Gerhard; Stapel, Wilhelm; Rosemann, Michael; and Seiler, Klaus D., to Durkoppwerke GmbH. Bobbin housing assembly in a sewing machine having at least one hook. 4,998,490, Cl. 112-231.000.

Goetz, George W.: *See—*
Vos, Thomas H.; Kumkoski, James M.; Knowlden, Leo S.; and Goetz, George W., 4,999,063, Cl. 149-109.600.

Gokhale, Kalyan P., to General Motors Corporation. Alternating current ignition system. 4,998,526, Cl. 123-598.000.

Gold, Nathan; Willenborg, David L.; Opsal, Jon; and Rosencwaig, Allan, to Therma-Wave, Inc. Method and apparatus for measuring thickness of thin films. 4,999,014, Cl. 356-382.000.

Goldfieds Engineering (Proprietary) Limited: *See—*
Prins, Petrus D., 4,998,483, Cl. 105-3.000.

Goldman, Ira B.: *See—*
Bellino, Joseph P.; Arnold, David; O'Brien, Dexter T.; and Goldman, Ira B., 4,999,464, Cl. 200-267.000.

Goldstar Co, Ltd.: *See—*
Yang, Keun Y., 4,999,482, Cl. 235-457.000.

Golia, Kenneth R., to Ultramatic Embroidery Machine Company. Computer controlled embroidery machine for embroidering on curved surfaces and attachment therefor. 4,998,964, Cl. 112-121.120.

Gollinger, Franz X.: *See—*
John, Thomas; Bock, Georg; Burger, Rainer; and Gollinger, Franz X., 4,998,475, Cl. 101-366.000.

Gollomp, Bernard P.: *See—*
Ilardi, Joseph M.; and Gollomp, Bernard P., 4,999,740, Cl. 361-386.000.

Golovchenko, Sergei I.: *See—*
Kuchuk-Yatsenko, Sergei I.; Krivenko, Valery G.; Kuznetsov, Petr V.; Bogatyrev, Vladimir J.; Golovchenko, Sergei I.; and Ignatenko, Vadim J., 4,999,476, Cl. 219-97.000.

Gontowski, Walter S., to Cherry Semiconductor Corporation. One-spot multivibrator. 4,999,527, Cl. 307-273.000.

Gonzales, Jose M.: *See—*
Shimizu, Takeshi; Saito, Kenji; Fushimi, Tomohisa; Huemann, Gisela; and Gonzales, Jose M., 4,998,770, Cl. 296-37.800.

Goodhue, William D.; Rediker, Robert H.; and Bossi, Donald E., to Massachusetts Institute of Technology. Method for forming tapered laser or waveguide optoelectronic structures. 4,999,316, Cl. 437-129.000.

Goodman, Barbro L.; and Houck, Willie G., Jr. Smoking article exhibiting reduced sidestream smoke, and wrapper paper therefor. 4,998,543, Cl. 131-365.000.

Goodman, Howard, to ECC International Limited. Granules of a detergent component coated with an organophilic clay. 4,999,125, Cl. 252-90.000.

Goodsmith, Dale H.; and Woods, Harold T., to Multifastener Corporation. Self-attaching fastener installation head. 4,998,659, Cl. 227-7.000.

Goossen, Lavern R.: *See—*
Anderson, J. Dale; and Goossen, Lavern R., 4,998,961, Cl. 100-4.000.

Gordon, Melvin L., to Melannco International Ltd. Combination picture frame and album introduction. 4,998,361, Cl. 40-152.000.

Gorman, John M. Removable lift spoiler for parked aircraft. 4,998,687, Cl. 244-100.00R.

Goto, Ryo; Tomitani, Tadafumi; Nitanda, Fumio; Toyoda, Manabu; and Ushijima, Makoto, to Hitachi Metals, Ltd. Magnetic core for flying-type composite magnetic head. 4,999,726, Cl. 360-120.000.

Gou, Perng-Fei; and Townsend, Harold E., to General Electric Company. Passive heat removal from containment. 4,998,509, Cl. 122-504.000.

Goulart, Joseph F.: *See—*
Black, Gregg T.; and Goulart, Joseph F., 4,998,524, Cl. 123-559.100.

Gourlaouen, Claire; Magnier, Claude; Latourrette, Bertrand; Tugaye, Anne; and Deneuve, Francoise, to Rhone-Poulenc Specialties Chimiques. Neodymium hydroxynitrate. 4,999,180, Cl. 423-592.000.

Grace, Martin K., to United Telecommunications, Inc. Synchronous quantized subcarrier multiplexer for digital transport of video, voice and data. 4,999,831, Cl. 370-50.000.

Gradecki, Raymond J.: *See—*
Kuhlman, Marvin G.; Sorensen, Gerald R.; and Gradecki, Raymond J., 4,999,465, Cl. 200-308.000.

Graham, Michael: *See—*
Mawer, Eric L.; Vanderminnen, Martin; Willans, Robert D. H.; Graham, Michael; and Manwell, Robert E., 4,998,579, Cl. 164-130.000.

Graiver, Daniel; and Tanaka, Osamu, to Dow Corning Corporation. Methods for making polydiorganosiloxane microemulsions. 4,999,398, Cl. 524-837.000.

Grant, Ronald W.: *See—*
Waldrop, James R.; and Grant, Ronald W., 4,999,685, Cl. 357-15.000.

Grattan, David A.: *See—*
Pierce, Claudia C.; Grattan, David A.; and Fong, Dodd W., 4,999,161, Cl. 422-12.000.

Grattan, Michael A.; and Wolberg, Sheldon J., to Dell Marking Systems, Inc. Electronically controlled marking. 4,999,645, Cl. 346-1.100.

Graves, Ernest D., Jr.: *See—*
Wolcott, Duane K.; Graves, Ernest D., Jr.; and Hunt, David G., 4,999,305, Cl. 436-52.000.

Gray, Ron: *See—*
Tarlow, Kenneth A.; and Gray, Ronald E., 4,998,704, Cl. 248-447.100.

Gray, Ronald E.: *See—*
Tarlow, Kenneth A.; and Gray, Ronald E., 4,998,704, Cl. 248-447.100.

Greene, Teddy R. Apparatus and method for positioning opposing marks on opposing surfaces. 4,998,355, Cl. 33-667.000.

Greer, Larry J., to Allied Gear and Machine Co., Inc. Rotary die slot adjustable gib assembly. 4,998,829, Cl. 384-255.000.

Grethe, Horst: *See—*
Panster, Peter; Grethe, Horst; and Kleinschmit, Peter, 4,999,413, Cl. 528-30.000.

Griffin, Robert R.; Roussel, Keith M.; and Fu, Ta-Wei, to Conoco Inc. Method of making graphite electrode nipple. 4,998,709, Cl. 264-29.500.

Griffith, Neil, to LTI Biomedical, Inc. Portable electro-therapy system. 4,998,532, Cl. 128-419.00F.

Grigo, Ulrich: *See—*
Leitz, Edgar; Bottenbruch, Ludwig; Ott, Karl-Heinz; Jung, Alfred; and Grigo, Ulrich, 4,999,420, Cl. 528-371.000.

Grimes, James B. Method of implanting extramedullary femoral head-neck prosthesis. 4,998,937, Cl. 606-89.000.

Grimes, William F., Jr.; and Dunn, John A., to Thermax Wire Corp. Process for manufacture of low density polytetrofluoroethylene insulated cable. 4,999,146, Cl. 264-127.000.

Grimm, Erwin; Koch, Christian; Hausler, Volker; Pfenning, Helmut; and Christ, Hubert, to Schott Glaswerke. Returning system for rail-bound transport carts without internal drive. 4,998,481, Cl. 104-166.000.

Groetzinger, Charles R., to Niche Design, Inc. Versatile wall mount folding table. 4,998,484, Cl. 108-42.000.

Gronvall, Daniel, to Raychem Corporation. Coaxial cable connector seal. 4,998,894, Cl. 439-521.000.

Grosjean, Laurent, to ETA S.A. Fabriques d'Ebauches. Watch case overlaid with a cap glued to the caseband. 4,999,823, Cl. 368-295.000.

Grossmann, Klaus; Walter, Helmut; and Wuerzer, Bruno, to BASF Aktiengesellschaft. Use of diphenyl ether derivatives for the desiccation and abscission of plant organs. 4,999,041, Cl. 71-70.000.

Grote & Hartmann GmbH & Co. KG: *See—*
Mantlik, Konrad, 4,998,893, Cl. 439-488.000.

Gruber, Thomas J., to Hunter Manufacturing Company. Fuel control system for a burner. 4,998,878, Cl. 431-90.000.

Grumman Aerospace Corporation: *See—*
Caputi, Stephen J.; Hobbs, Douglas S.; Pernick, Benjamin J.; Fonneland, Nils J.; and Fine, John V., Sr., 4,998,787, Cl. 350-3.730.

Grush, Robert: *See—*
Mouton, William J.; Grush, Robert; and Alton, Dolores B., 4,998,844, Cl. 405-21.000.

Grycan, Stanley M.: *See—*
Gaffney, Thomas E.; Klessig, Clarence E.; Weir, Alan J.; and Grycan, Stanley M., 4,998,321, Cl. 16-110.00R.

GTE Laboratories Incorporated: *See—*
Klinedinst, Keith A.; and Gary, Richard A., 4,999,219, Cl. 427-69.000.
Koai, Kwang T., 4,998,791, Cl. 350-96.140.
Thibodeau, Rodrigue G., 4,999,145, Cl. 264-60.000.

GTE Products Corporation: *See—*
Cheresnowsky, Michael J., 4,999,169, Cl. 423-54.000.

GTE Valenite Corporation: *See—*
Hunt, Carl E., 4,998,851, Cl. 408-143.000.

GTY Industries: *See—*
Poppenheimer, Charles B., 4,999,757, Cl. 362-287.000.

Guardian Technologies, Inc.: *See—*
Williamson, Lon A.; Pennypacker, Frank C.; Collier, Donald W.; and Fuller, Kip L., 4,999,613, Cl. 340-573.000.

Guarneri, Roberto; and Ferrari, Claudio, to Barilla G.E.R. F.LLI - Societa per Azioni. Method for heat prepackaged food products using microwaves in a heated superatmospheric chamber. 4,999,471, Cl. 219-10.55M.

Gueremy, Claude: *See—*
Comte, Marie-Therese; Gueremy, Claude; and Ponsinet, Gerard, 4,999,355, Cl. 514-253.000.

Guerif, Gerard, to Eurodia S.A. Separator frame for a two-fluid exchanger device. 4,999,107, Cl. 210-224.000.

Guilbaud, Daniel: *See*—
Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; and Leclere, Jean, 4,998,322, Cl. 452-71.000.

Guiver, Michael D.; and Kutowy, Oleh, to Canada, National Research Council of Canada/Conseil de Recherches. Aromatic polysulfone compounds and their manufacture. 4,999,415, Cl. 528-171.000.

Gulczynski, Zdzislaw. Switching power supply comprising pair of converters for obtaining constant or sinusoidal input current and fixed or variable output voltage. 4,999,568, Cl. 323-351.000.

Guntly, Leon A.; and Costello, Norman F., to Modine Manufacturing Company. Condenser with small hydraulic diameter flow path. 4,998,580, Cl. 165-133.000.

Gupta, Surendra K.: *See*—
deCastro, Aurora F.; Gupta, Surendra K.; and Shantz, Steven M., 4,999,288, Cl. 435-18.000.

Guscott, John K., to Aritech Corporation. Multi-range infrared detector. 4,999,610, Cl. 340-567.000.

Haas, Roger: *See*—
Distefano, Joseph; Haas, Roger; Nestle, Mark; and Kelley, Fred D., 4,998,658, Cl. 226-95.000.

Habenicht, Helmut: *See*—
Schetina, Otto; Kissich, Arnulf; Stecher, Werner; Habenicht, Helmut; Papst, Wilhelm; and Pleterski, Bernhard, 4,998,777, Cl. 299-67.000.

Haddock, Loren B.; Ballinger, Bruce D.; and Gelb, George H., to TRW Inc. Production of precision patterns on curved surfaces. 4,999,277, Cl. 430-269.000.

Haegele, Gerhard: *See*—
Liedek, Egon; and Haegele, Gerhard, 4,999,134, Cl. 252-389.510.

Hagiwara, Teruyoshi: *See*—
Murakami, Azuma; Hagiwara, Teruyoshi; Tuchida, Yoichi; and Johno, Hideki, 4,999,461, Cl. 178-19.000.

Haino, Kozo: *See*—
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Hakala, Marja-Riitta: *See*—
Jappinen, Kalervo A.; Hakala, Marja-Riitta; Jalava, Jouko S.; and Lehto, Ari, 4,998,431, Cl. 73-1.00G.

Hakamatsuka, Yasuharu: *See*—
Funakubo, Tomoki; Hakamatsuka, Yasuharu; Aihara, Mamoru; Watanabe, Kazuhiro; Koshiishi, Kiyozou; and Shigetomi, Sadao, 4,998,872, Cl. 425-143.000.

Halbach & Braun Industrieanlagen: *See*—
Braun, Gert; and Braun, Ernst, 4,998,778, Cl. 299-91.000.

Halkey-Roberts Corporation: *See*—
Foltz, Carl L., 4,998,562, Cl. 137-877.000.

Hall, Charles E.: *See*—
Hyatt, Richard G., Jr.; and Hall, Charles E., 4,998,952, Cl. 70-395.000.

Hall, David M.: *See*—
McCullough, Francis P., Jr.; Hall, David M.; Stobby, William G.; and Suh, Kyung W., 4,999,385, Cl. 521-149.000.

Hall, Iris H.: *See*—
Izydore, Robert A.; and Hall, Iris H., 4,999,366, Cl. 514-380.000.

Halliburton Logging Services, Inc.: *See*—
Barker, James M., 4,998,477, Cl. 102-275.600.
Zimmer, Mark D., 4,999,817, Cl. 367-65.000.

Halsey, James H.: *See*—
Halsey, Johnny H.; and Halsey, James H., 4,998,612, Cl. 194-350.000.

Halsey, Johnny H.; and Halsey, James H., to IDX, Inc. Meter box with hidden hinged door. 4,998,612, Cl. 194-350.000.

Hamada, Mitsuo: *See*—
Shimizu, Koji; Yamadera, Toyohiko; and Hamada, Mitsuo, 4,999,131, Cl. 252-314.000.

Hamagishi, Yasutaro: *See*—
Toda, Soichiro; Hamagishi, Yasutaro; Oki, Toshikazu; and Tomita, Koji, 4,999,349, Cl. 514-183.000.

Hamamoto, Masato: *See*—
Usami, Mitsuo; Shiozawa, Noboru; Yamada, Toshio; Katoh, Hiromasa; Satoh, Kazuyoshi; Kobayashi, Tohru; Kimura, Tatsuya; Hamamoto, Masato; Shimizu, Atsushi; and Koyu, Kaoru, 4,999,520, Cl. 307-456.000.

Hamanaka, Kenjiro, to Nippon Sheet Glass Co., Ltd. Coherent optical apparatus. 4,999,006, Cl. 350-162.120.

Hamano, Hiroyuki: *See*—
Tsuji, Sadahiko; Hamano, Hiroyuki; Mogi, Hirokazu; Ogino, Shigeru; Noguchi, Kazuhiro; and Kobayashi, Takashi, 4,998,809, Cl. 350-500.000.

Hamano, Toshio; and Natsume, Shigeo, to Fujitsu Limited. Method of manufacturing semiconductor device having package structure. 4,999,319, Cl. 437-209.000.

Hamatani, Toshiji: *See*—
Yamazaki, Shunpei; Mase, Akira; and Hamatani, Toshiji, 4,999,693, Cl. 357-30.000.

Hamma, Noriyuki: *See*—
Kitsukawa, Goro; Yanagisawa, Kazumasa; Kawahara, Takayuki; Hori, Ryoichi; Nakagome, Yoshinobu; Hamma, Noriyuki; Itoh, Kiyoo; and Tukada, Hiromi, 4,999,519, Cl. 307-446.000.

Hammerslag, Gary R.: *See*—
Hammerslag, Julius G.; and Hammerslag, Gary R., 4,998,916, Cl. 604-95.000.

Hammerslag, Julius G.; and Hammerslag, Gary R. Steerable medical device. 4,998,916, Cl. 604-95.000.

Hanaoka, Osamu: *See*—
Seki, Masaki; Samukawa, Koji; and Hanaoka, Osamu, 4,999,765, Cl. 364-191.000.

Hancock, Charles O.: *See*—
Calabra, Daniel; Hancock, Charles O.; and Avant, Brian, 4,999,165, Cl. 422-113.000.

Hanna, Marie R.: *See*—
Sprecker, Mark A.; Belko, Robert P.; Hanna, Marie R.; Beck, Charles E. J.; and Brucato, Salvatore M., 4,999,439, Cl. 549-397.000.

Hannah, Ralph E., to Unimed, Inc. Aspirating device. 4,998,915, Cl. 604-73.000.

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Oetiker, Hans, 4,998,326, Cl. 24-20.00R.

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Hansen, Robert G., to R. G. Hansen & Associates. Method and apparatus for removing ground contaminants. 4,998,848, Cl. 405-128.000.

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Hara, Hajime: *See*—
Kaminade, Tadahiro; Iida, Shigeki; Toya, Tomohiro; and Hara, Hajime, 4,999,416, Cl. 528-190.000.

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Hanyu, Susumu; Kasuga, Noboru; Hara, Kazumasa; and Morimoto, Shuzo, 4,998,491, Cl. 112-262.100.

Hara, Kunihiko; Kojima, Keisuke; and Kyuma, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. Optical logic element with short switching time. 4,999,688, Cl. 357-19.000.

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Nakano, Hirofumi; Hara, Mitsunobu; Takahashi, Isami; Asano, Kozo; Iida, Takao; and Morimoto, Makoto, 4,999,196, Cl. 424-116.000.

Harada, Takeshi: *See*—
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Hardigg Industries, Inc.: *See*—
Hardigg, James S., 4,998,636, Cl. 220-4.340.

Hardigg, James S., to Hardigg Industries, Inc. Electronic rack and mounting frame. 4,998,636, Cl. 220-4.340.

Hardy, Samuel G.: *See*—
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Hariri, Robert J.: *See*—
Ghajar, Jamshid B. G.; Ghadjar, Fathali G.; and Hariri, Robert J., 4,998,938, Cl. 606-130.000.

Harkreader, Gordon G.: *See*—
Bunning, Donald L.; Etzkorn, William G.; Haydon, William M.; Harkreader, Gordon G.; Kurland, Jonathan J.; Liu, Wai C.; and Vera-Castaneda, Ernesto, 4,999,452, Cl. 560-208.000.

Harrington, Robert J. Screen printing system and method. 4,998,471, Cl. 101-126.000.

Harris, Arthur, to Davis Meditech, Inc. Precision liquid handling apparatus. 4,998,866, Cl. 417-460.000.

Harris, Curtis H.: *See*—
Bayer, Dean M.; Harris, Curtis H.; and Jones, Bradley A., 4,998,761, Cl. 293-121.000.

Harris Data Communications, Inc.: *See*—
Norton, Daniel J., 4,999,542, Cl. 315-85.000.

Harrison, Daniel J.: *See*—
Mruk, William A.; Harrison, Daniel J.; and Campbell, Bruce C., 4,999,335, Cl. 503-227.000.

Hart, Brian, to Cooper Industries, Inc. Adjustable connection apparatus. 4,998,756, Cl. 285-298.000.

Hart, William G.: *See*—
Baer, Patricia B.; Hunter, Kevin D.; Hart, William G.; Axelrod, Barry H.; and Sansone, Ronald P., 4,999,481, Cl. 235-375.000.

Hartings, Michael F.: *See*—
Cordery, Robert A.; and Hartings, Michael F., 4,999,641, Cl. 343-742.000.

Hartman, Richard B. Thumb wrestling game apparatus with stabilizing handle. 4,998,724, Cl. 273-1.0GI.

Hartmann & Braun AG: *See*—
Zoechbauer, Michael; and Fabinski, Walter, 4,999,013, Cl. 356-346.000.

Hartmann, Clinton S.: *See*—
Mariani, Elio A.; and Hartmann, Clinton S., 4,999,535, Cl. 310-313.00B.

Hartmann, Yves: *See*—
Costes, Michel; Gach, Alain; Hartmann, Yves; and Peyronnenc, Michel, 4,999,769, Cl. 364-200.000.

Hartmeister, Ruben J. Power driven hand tool assembly. 4,998,351, Cl. 30-228.000.

Haruna, Tohru; and Nishikawa, Kazunori, to Adeka Argus Chemical Co., Ltd. Phosphonite compound and synthetic resin composition. 4,999,393, Cl. 524-126.000.

Hasan, Syed R.; and Beach, John R., to Illinois Tool Works, Inc. Fastener-driving and batten-positioning machine. 4,998,662, Cl. 227-111.000.

Hasegawa, Akira, to Fuji Photo Film Co., Ltd. Presensitized plate. 4,999,273, Cl. 430-138.000.

Hashimoto, Masashi, to Texas Instruments Incorporated. Dynamic memory with internal refresh circuit and having virtually refresh-free capability. 4,999,814, Cl. 365-222.000.

Hashimoto, Misao; Ito, Satoshi; Miyajima, Shunpei; Ito, Wataru; and Komori, Tadashi, to Nippon Steel Corp. Chrome-coated stainless steel having good atmospheric corrosion resistance. 4,999,259, Cl. 428-685.000.

Hashimoto, Shigeru: *See—*
Watanabe, Yukio; Hashimoto, Shigeru; and Hosoi, Nobuyuki, 4,999,217, Cl. 427-48.000.

Hashimoto, Tuyoshi: *See—*
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Hatakeyama, Seiji: *See—*
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Hauck, Dieter: *See—*
Rodi, Anton; Hauck, Dieter; Lehnert, Michael; and Jurkewitz, Manfred, 4,998,472, Cl. 101-216.000.

Hauer, Horst-Walter, to Koenig & Bauer Aktiengesellschaft. Flush inking unit. 4,998,474, Cl. 101-366.000.

Hausler, Volker: *See—*
Grimm, Erwin; Koch, Christian; Hausler, Volker; Pfenning, Helmut; and Christ, Hubert, 4,998,481, Cl. 104-166.000.

Hauzer Holding B.V.: *See—*
Tietema, Roel, 4,999,760, Cl. 363-53.000.

Havens, Marvin R.; and Roberts, William P., to W. R. Grace & Co.-Conn. Permanent antistatic acid copolymer/quaternary amine mixtures films. 4,999,252, Cl. 428-515.000.

Hawley, John R.: *See—*
Bickford, Dale M.; Farnsworth, Richard G.; Hardy, Samuel G.; Hawley, John R.; and Varney, Albert R., Jr., 4,999,572, Cl. 342-103.00R.

Hay & Forage Industries: *See—*
Anderson, J. Dale; and Goossen, Lavern R., 4,998,961, Cl. 100-4.000.

Hayano, Fuminori; Imamura, Kazunori; Murata, Sunao; and Kato, Kinya, to Nikon Corporation. Apparatus for detecting foreign particles on a surface of a reticle or pellicle. 4,999,510, Cl. 250-571.000.

Hayashi, Michio: *See—*
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Hayashi, Naotake, to Stax Industries Limited. Resistor for audio/video signal circuit. 4,999,602, Cl. 338-308.000.

Hayashi, Takashi: *See—*
Tokoro, Setsuo; Watanabe, Tomoyuki; Hayashi, Takashi; and Shigematsu, Takashi, 4,999,774, Cl. 364-424.100.

Hayashi, Yoshihiro, to NEC Corporation. Bonding structure of substrates and method for bonding substrates. 4,998,665, Cl. 228-180.100.

Haydon, William M.: *See—*
Bunning, Donald L.; Etzkorn, William G.; Haydon, William M.; Harkreader, Gordon G.; Kurland, Jonathan J.; Liu, Wai C.; and Vera-Castaneda, Ernesto, 4,999,452, Cl. 560-208.000.

Hayes, Michael E., to Emulsan Biotechnologies Inc. Personal care products containing bioemulsifiers. 4,999,195, Cl. 424-114.000.

Haynes, James P.: *See—*
Huff, George L.; Archer, Robert; and Haynes, James P., 4,998,774, Cl. 297-461.000.

Haynes, Lynn C.: *See—*
Lengerich, Bernhard V.; Haynes, Lynn C.; Levine, Harry; Otterburn, Michael S.; Mathewson, Paul; and Finley, John, 4,999,208, Cl. 426-549.000.

Hayward, James A.: *See—*
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Hazeltine Corporation: *See—*
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Hedley Purvis Limited: *See—*
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Hefner, Werner: *See—*
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Hegland, Joel E.: *See—*
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Heidelberger Druckmaschinen AG: *See—*
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Heifetz, Aaron H.: *See—*
Wolfe, Richard A.; Heifetz, Aaron H.; Braatz, James A.; and Donofrio, David M., 4,999,298, Cl. 435-240.242.

Heinrich, Michael: *See—*
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Heinzelmann, Karl-Fritz: *See—*
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Heisley, David A.: *See—*
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Heistand, Robert H., II: *See—*
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Helton, John S.: *See—*
Chen, Hung-San; Farleigh, Scott E.; Helton, John S.; and Larson, Allen L., 4,999,832, Cl. 370-85.140.

Henche, Wolfgang: *See—*
Schilling, Jurgen; Reichmann, Horst; Henche, Wolfgang; Pieper, Thomas; Braun, Bernd; and Ludowisy, Hans, 4,998,877, Cl. 431-19.000.

Henderson, Alan R., to Hughes Aircraft Company. Automatic image correction method and apparatus for projectors utilizing cathode ray tubes. 4,999,703, Cl. 358-60.000.

Hendriock, Hans-Jurgen: *See—*
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Hengst, Alfred: *See—*
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Henke, James A. Cargo hook. 4,998,763, Cl. 294-82.330.

Henning, Rainer: *See—*
Ruger, Wolfgang; Urbach, Hansjorg; Henning, Rainer; Stechl, Jens; Usinger, Patricia; and Hock, Franz, 4,999,370, Cl. 514-412.000.

Henry, Charles H.; Kazarinov, Rudolf F.; and Shani, Yosi, to AT&T Bell Laboratories. Adiabatic polarization manipulating device. 4,998,793, Cl. 350-96.150.

Hercules Incorporated: *See—*
Gawin, Irena, 4,999,238, Cl. 428-283.000.

Herriot, Glen A.: *See—*
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Herstein, Morris: *See—*
Cioca, Gheorghe; Hayward, James A.; Tan, Manuel L.; Herstein, Morris; and Smith, Walter P., 4,999,348, Cl. 514-171.000.

Hetzel, Henry T. Hour meter activated by magnetic influence. 4,999,820, Cl. 368-9.000.

Heubg-Ah Tire & Rubber Co., Ltd.: *See—*
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Hewlett-Packard Company: *See—*
Cham, Kit M.; and Gleason, Robert E., Jr., 4,999,523, Cl. 307-570.000.
Chan, C. S., 4,999,652, Cl. 346-140.00R.
DaSilva, Marcus, 4,999,589, Cl. 331-117.00R.
Fiasconaro, James G., 4,999,789, Cl. 364-518.000.
McAllister, Jeffrey S.; and Johnson, Steven M., 4,999,724, Cl. 360-98.080.
Meyer, Robert G.; and Scotten, Jeffrey D., 4,999,586, Cl. 330-288.000.
Tambe, Atul; and Wilson, Michael, 4,999,573, Cl. 324-121.00R.
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Hilbert, Samuel D.: *See—*
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Hildebrandt, Ulrich: *See—*
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Hill, William L. Jumper terminal system. 4,999,562, Cl. 320-7.000.

Hillinger, George, to Alltrade, Inc. Four ply fold-up display and carrying case. 4,998,616, Cl. 206-45.110.

Hilti Aktiengesellschaft: *See—*
Manschitz, Erwin, 4,998,588, Cl. 173-47.000.

Hinrichs, Wolfgang: *See—*
Ruhl, Thomas; Muller, Armin; and Hinrichs, Wolfgang, 4,999,778, Cl. 364-426.020.

Hinzpeter, Jurgen, to Wilhelm Fette GmbH, Firma. Method of quality assurance in the manufacture of tablets. 4,999,151, Cl. 264-40.400.

Hiramatsu, Naoto: *See—*
Uematsu, Yoshihiro; Shimizu, Isami; and Hiramatsu, Naoto, 4,999,159, Cl. 420-53.000.

Hirano, Eiji: *See—*
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Hirao, Yoshichika; Hosoya, Nobukazu; Ishii, Takaaki; and Amino, Tadashi, to Sanyo Electric Co., Ltd. Synchronizing signal separating circuit separating synchronizing signal from a composite video signal. 4,999,707, Cl. 358-153.000.

Hiraoka, Hiroyuki, to International Business Machines Corporation. Spray silylation of photoresist images. 4,999,280, Cl. 430-330.000.

Hiraoka, Takeshi; Takeguchi, Shunsuke; and Kawai, Satoshi, to Nippon Piston Ring Co., Ltd. Assembled camshaft. 4,998,955, Cl. 74-567.000.

Hirokawa, Masayuki, to Mitsubishi Denki Kabushiki Kaisha. Data transfer control units each of which comprises processors and dual-part memory. 4,999,768, Cl. 364-200.000.

Hiromura, Paul. Portable shaving brush. 4,998,545, Cl. 132-290.000.

Hirose, Masayuki: *See—*
Miyata, Masanori; Komiya, Yutaka; Nakamura, Shinichi; Hirose, Masayuki; Mori, Toshihiko; and Nakayama, Tomobumi, 4,999,674, Cl. 355-218.000.

Hirota, Kanji: *See*—
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Hisatake, Michio; Kongo, Takeshi; Sasako, Hidenori; and Ebata, Yoshikazu, to Janome Sewing Machine Industry Co., Ltd. Embroidering machines having graphic input means. 4,998,489, Cl. 112-103.000.
Hitachi, Ltd.: *See*—
Ara, Mari; Sawamoto, Hideo; and Imai, Kaname, 4,999,770, Cl. 364-200.000.
Fukuzawa, Sooichi; and Yano, Kazuyuki, 4,998,861, Cl. 415-206.000.
Kitsukawa, Goro; Yanagisawa, Kazumasa; Kawahara, Takayuki; Hori, Ryoichi; Nakagome, Yoshinobu; Hamma, Noriyuki; Itoh, Kiyoo; and Tukada, Hiromi, 4,999,519, Cl. 307-446.000.
Nihei, Masayasu; Onuki, Jin; Koubuchi, Yasushi; Miyazaki, Kunio; and Itagaki, Tatsuo, 4,999,096, Cl. 204-192.300.
Osakabe, Nobuyuki; and Tonomura, Akira, 4,998,788, Cl. 350-3.800.
Takahumi, Tokunaga; Masatoshi, Tsuneoka; Hiroyuki, Akimori; and Mitsuaki, Horiuch, 4,999,318, Cl. 437-194.000.
Usami, Mitsuo; Shiozawa, Noboru; Yamada, Toshio; Katoh, Hiromasa; Satoh, Kazuyoshi; Kobayashi, Tohru; Kimura, Tatsuya; Hamamoto, Masato; Shimizu, Atsushi; and Koyu, Kaoru, 4,999,520, Cl. 307-456.000.
Hitachi Maxell Ltd.: *See*—
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Goto, Ryo; Tomitani, Tadafumi; Nitanda, Fumio; Toyoda, Manabu; and Ushijima, Makoto, 4,999,726, Cl. 360-120.000.
Hitachi VLSI Engineering Corporation: *See*—
Kitsukawa, Goro; Yanagisawa, Kazumasa; Kawahara, Takayuki; Hori, Ryoichi; Nakagome, Yoshinobu; Hamma, Noriyuki; Itoh, Kiyoo; and Tukada, Hiromi, 4,999,519, Cl. 307-446.000.
Hixson, William J. Self-operating lash-adjusting tappet assembly. 4,998,514, Cl. 123-90.530.
Ho, Ying-wai: *See*—
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Hobbs, Douglas S.: *See*—
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Hock, Franz: *See*—
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Hoebener, Karl G.: *See*—
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Hoechst Aktiengesellschaft: *See*—
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Englert, Heinrich C.; Lang, Hans-Jochen; Mania, Dieter; and Scholkens, Bernward, 4,999,371, Cl. 514-422.000.
Kampe, Klaus-Dieter; Usinger, Patricia; Siegel, Herbert; Alpermann, Hans G.; and Gerhards, Hermann J., 4,999,352, Cl. 514-235.800.
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Hoechst Celanese Corporation: *See*—
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Hoechst-Roussel Pharmaceuticals, Inc.: *See*—
Kosley, Raymond W., Jr.; O'Malley, Gerard; and Spahl, Bettina, 4,999,351, Cl. 514-228.200.
Martin, Lawrence L.; Payack, Joseph F.; and Ong, Helen H., 4,999,358, Cl. 514-297.000.
Strupczewski, Joseph T., 4,999,356, Cl. 514-254.000.
Hoegerle, Karl: *See*—
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Hoeschele, James D.; and Werbel, Leslie M., to Warner-Lambert Co. Novel neutral mixed ligand platinum(II) and platinum(IV) complexes. 4,999,444, Cl. 556-137.000.
Hofacre, Charles L.: *See*—
Glisson, John R.; and Hofacre, Charles L., 4,999,191, Cl. 424-92.000.
Hoffman, Wayne L.; and Jump, Adrien A., to Board of Regents, The University of Texas System. Rehydratable agarose gels. 4,999,340, Cl. 514-23.000.
Hoffmann-La Roche Inc.: *See*—
Bachynsky, Maria O.; Infeld, Martin H.; Margolis, Richard J.; and Perla, Dennis A., 4,999,375, Cl. 514-455.000.
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Nakase, Noriaki; Hokkedo, Mamoru; Yamamoto, Etsuji; Yoshida, Masahiko; and Kitayama, Yuyaka, 4,999,089, Cl. 196-110.000.
Holl, William H.; and Wang, Wei-Ming, to General Motors Corporation. Closed loop mass airflow determination via throttle position. 4,999,781, Cl. 364-431.050.
Holler, Roger A.: *See*—
Dale, John R.; and Holler, Roger A., 4,999,816, Cl. 367-4.000.
Hollifield, David L. Apparatus for precision cutting of concrete surfaces. 4,998,775, Cl. 299-39.000.
Holmer, Curtis I.: *See*—
Mardian, James K. W.; and Holmer, Curtis I., 4,998,598, Cl. 181-284.000.
Holmwood, Graham; Kraatz, Udo; Buchel, Karl H.; Brandes, Wilhelm; Dutzmann, Stefan; and Reinecke, Paul, to Bayer Aktiengesellschaft. Fungicidal hydroxyalkyl-triazolyl derivatives. 4,999,440, Cl. 549-556.000.
Holt, John B.; Miles, Simon J.; and Wilkin, Arthur L., to National Research Development Corporation. Transplanting equipment. 4,998,945, Cl. 47-1.010.
Holtzen, Dwight A.; and Reid, Austin H., Jr., to Du Pont de Nemours, E. I., and Company. TiO_2 pigments resistant to discoloration in the presence of polymer additives. 4,999,055, Cl. 106-436.000.
Holzapfel, Robert C.; Mottet, Michael P.; and Riggle, Thomas W., to Iowa State University Research Foundation, Inc. Masonry wall structure and method of making the same. 4,998,394, Cl. 52-426.000.
Holzer, Walter. Cold indicator for controlling the cooling or freezing of foods, medicines and the like. 4,998,827, Cl. 374-160.000.
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Feichtiger, Dieter; Holzhauer, Horst; Kneib, Rudi; Polic, Marko; and Weikert, Gunther, 4,998,447, Cl. 74-502.600.
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Honda Giken Kogyo Kabushiki Kaisha: *See*—
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Honda, Kazuyoshi; Sugita, Ryuji; Tohma, Kiyokazu; Kawawake, Yasuihiro; and Murakami, Yoshiki, to Matsushita Electric Industrial Co., Ltd. Method for manufacturing perpendicular magnetic recording medium. 4,999,220, Cl. 427-132.000.
Honeywell Inc.: *See*—
Anderson, Gregory W.; Landis, William R.; Patton, Paul B.; Schimbke, Paul A.; and Seidel, Michael J., 4,999,792, Cl. 364-550.000.
BeVan, Erik T., 4,999,782, Cl. 364-448.000.
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Hong, Shane Y.: *See*—
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Horikawa, Akinori, to NEC Corporation. Failure recovery informing arrangement with simplified hardware in a data processing system. 4,999,838, Cl. 371-16.100.
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Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,998,867, Cl. 418-256.000.
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Horiuchi, Kenji, to Sharp Kabushiki Kaisha. Transmissive liquid crystal display device. 4,998,804, Cl. 350-334.000.
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Merger, Franz; Horler, Hans; Hoelderich, Wolfgang; and Witzel, Tom, 4,999,453, Cl. 560-211.000.
Horn, Robert K.: *See*—
Lueth, Gero; Becker, Rolf; Horn, Robert K.; Kempe, Uwe; and Vodrazka, Wolfgang, 4,999,029, Cl. 48-197.00R.
Horner, Patrick J.: *See*—
Towle, Ian D. H.; and Horner, Patrick J., 4,999,411, Cl. 528-9.000.
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Ojima, Fumio; Mashimo, Kiyokazu; Hozumi, Masahiko; Hoshizaki, Taketoshi; and Nakamura, Kazuyuki, 4,999,268, Cl. 430-59.000.
Hosoi, Nobuyuki: *See*—
Watanabe, Yukio; Hashimoto, Shigeru; and Hosoi, Nobuyuki, 4,999,217, Cl. 427-48.000.
Hosoya, Akira: *See*—
Maruo, Fumitaka; and Hosoya, Akira, 4,999,654, Cl. 346-160.000.
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Hirao, Yoshichika; Hosoya, Nobukazu; Ishii, Takaaki; and Amino, Tadashi, 4,999,707, Cl. 358-153.000.
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Goodman, Barbro L.; and Houck, Willie G., Jr., 4,998,543, Cl. 131-365.000.
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Barth, John E., Jr.; Drake, Charles E.; Hovis, William P.; Kalter, Howard L.; Kelley, Gordon A., Jr.; Lewis, Scott C.; Nickel, Daniel J.; and Yankosky, James A., 4,999,815, Cl. 365-230.060.
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Lane, Jan M.; Corrigan, John; and Crouch, Philip D., 4,998,581, Cl. 164-517.000.

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Hsu, Sheng T.; and Flatley, Doris W., to General Electric Company. Integrated circuit with stacked MOS field effect transistors. 4,999,691, Cl. 357-23.700.

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Chen, Shien-Chang; Cheng, Wan-Jy; Lin, Fu-Shen; and Huang, Fu-Juh, 4,999,177, Cl. 423-415.00A.

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Shimizu, Takeshi; Saito, Kenji; Fushimi, Tomohisa; Huemann, Gisela; and Gonzales, Jose M., 4,998,770, Cl. 296-37.800.

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Gibson, Owen E.; Gleeson, William J.; Burkholder, Larry D.; and Benton, Bradley K., 4,998,664, Cl. 228-102.000.
Henderson, Alan R., 4,999,703, Cl. 358-60.000.
Longerich, Ernest P.; and D'Agostino, Saverio A., 4,998,688, Cl. 244-3.160.
Niho, Yoji G., 4,999,635, Cl. 342-25.000.
Park, Joon; Taketani, Stanley; Leung, Han C.; and Pelzman, George, 4,998,712, Cl. 269-25.000.
Prince, Lawrence S., 4,999,262, Cl. 429-104.000.
Washburn, Robert D.; McClanahan, Robert F.; and Wedeen, Robert S., 4,999,583, Cl. 330-86.000.

Hui, Benjamin C.: *See—*
Kanjolia, Ravi K.; and Hui, Benjamin C., 4,999,223, Cl. 427-252.000.

Hui, Henry K.: *See—*
Yafuso, Masao; and Hui, Henry K., 4,999,306, Cl. 436-68.000.

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Hull, Harold L.; and Buethe, Kenneth W. Traction hook and rope lock. 4,998,327, Cl. 24-134.00R.

Hull, John, Jr., to DowElanco. Process for the preparation of 2-alkylpyrimidines. 4,999,427, Cl. 544-242.000.

Hull, Michael. Process and composition for washing soiled polyester fabrics. 4,999,129, Cl. 252-174.170.

Hunt, Carl E., to GTE Valenite Corporation. Vibration dampened boring bar. 4,998,851, Cl. 408-143.000.

Hunt, David G.: *See—*
Wolcott, Duane K.; Graves, Ernest D., Jr.; and Hunt, David G., 4,999,305, Cl. 436-52.000.

Hunt, Robert N.; and Sandridge, Robert L., to Mobay Corporation. Remote sensing gas analyzer. 4,999,498, Cl. 250-338.500.

Hunter, James R.: *See—*
Chun, Victor L.; and Hunter, James R., 4,998,958, Cl. 83-133.000.

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Baer, Patricia B.; Hunter, Kevin D.; Hart, William G.; Axelrod, Barry H.; and Sansone, Ronald P., 4,999,481, Cl. 235-375.000.

Hunter Manufacturing Company: *See—*
Gruber, Thomas J., 4,998,878, Cl. 431-90.000.

Hurh, Patrick G., to DowBrands Inc. Roll-restraining dispensing carton. 4,998,656, Cl. 225-47.000.

Hutchinson, William R., to Ingersoll-Rand Company. Air compressor pressure regulating valve system. 4,998,862, Cl. 417-28.000.

Hwang, Ming Y.; and Lin, So Y. Filtering device for removing liquid particles from air streams of air compressors. 4,999,036, Cl. 55-317.000.

Hwang, Woo-hyun: *See—*
Kim, Dae-il; and Hwang, Woo-hyun, 4,999,541, Cl. 313-584.000.

Hyakumura, Kazushi, to Olympus Optical Co., Ltd. Optical film thickness measuring device for measuring two-layer film thicknesses using spectral reflectance. 4,999,508, Cl. 250-560.000.

Hyakumura, Kazushi: *See—*
Wada, Yorio; and Hyakumura, Kazushi, 4,999,509, Cl. 250-560.000.

Hyatt, Richard G., Jr.; and Hall, Charles E., to Medeco Security Locks, Inc. Key for electronic and mechanical locks. 4,998,952, Cl. 70-395.000.

Hygeia Sciences, Inc.: *See—*
Lennon, Donald J.; and Murphy, Timothy C., Jr., 4,999,163, Cl. 422-58.000.

Hyll, John, to Baker International Corporation. Vane core assembly for use in making centrifugal elastomer coated impellers. 4,998,706, Cl. 249-184.000.

Hyundai Electronics Industries Co., Ltd.: *See—*
Yoon, Yong H., 4,999,312, Cl. 437-52.000.

Iacoviello, John G.; Davidowich, George; Vijayendran, Bheema R.; and Sadowski, John S., to Air Products and Chemicals, Inc. Ethylene-vinyl chloride copolymer emulsions containing tetramethylol glycoluril for use as binder compositions. 4,999,239, Cl. 428-288.000.

Ichibiki Co., Ltd.: *See—*
Fukuyasu, Shigeki; Nakamura, Makoto; Kawachi, Kyozo; Yamaguchi, Seiji; Kinoshita, Sakan; and Numata, Tadashi, 4,999,203, Cl. 426-46.000.

Ichiki, Toshio: *See—*
Kojima, Hiroaki; Ichiki, Toshio; Shibata, Shigehito; Harada, Takeshi; Hirano, Eiji; and Atsuta, Shoji, 4,999,147, Cl. 264-139.000.

ICI Australia Operations Proprietary Limited: *See—*
Snare, Margaret J.; Yates, David; and Sanders, Ross, 4,999,062, Cl. 149-2.000.

Idaka, Eiichi, to Suntory Limited. Acylated anthocyanin and process for producing the same as well as pigment composition containing the same. 4,999,423, Cl. 536-4.100.

Ide, Hiroshi: *See—*
Kawashima, Shigeru; Ide, Hiroshi; Kato, Kazuaki; Magara, Mitsuo; and Ishii, Yoshibumi, 4,999,058, Cl. 127-29.000.

Idel, Karsten-Josef: *See—*
Genz, Joachim; Tresper, Erhard; Idel, Karsten-Josef; Bottenbruch, Ludwig; and Eckhardt, Volker, 4,999,414, Cl. 528-125.000.

IDX, Inc.: *See—*
Halsey, Johnny H.; and Halsey, James H., 4,998,612, Cl. 194-350.000.

IDX Technologies, Inc.: *See—*
Loeb, Warner, 4,999,621, Cl. 340-825.340.

Igarashi, Ichiro; and Ito, Hiroaki, to Tokai Rubber Industries, Ltd. Refrigerant-transporting hose. 4,998,564, Cl. 138-126.000.

Igawa, Kazushige: *See—*
Kamiyama, Katsumi; and Igawa, Kazushige, 4,999,173, Cl. 423-239.000.

Ignatenko, Vadim J.: *See—*
Kuchuk-Yatsenko, Sergei I.; Krivenko, Valery G.; Kuznetsov, Petr V.; Bogatyrev, Vladimir J.; Golovchenko, Sergei I.; and Ignatenko, Vadim J., 4,999,476, Cl. 219-97.000.

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Iguchi, Katsuji; Urai, Masahiko; and Masuichi, Chiyako, to Sharp Kabushiki Kaisha. Semiconductor memory. 4,999,689, Cl. 357-23.600.

Iida, Shigeki: *See—*
Kaminade, Tadahiro; Iida, Shigeki; Toya, Tomohiro; and Hara, Hajime, 4,999,416, Cl. 528-190.000.

Iida, Takao: *See—*
Nakano, Hirofumi; Hara, Mitsunobu; Takahashi, Isami; Asano, Kozo; Iida, Takao; and Morimoto, Makoto, 4,999,196, Cl. 424-116.000.

Iima, Mitsunori: *See—*
Iizuka, Takashi; Iima, Mitsunori; and Morimoto, Akira, 4,998,790, Cl. 350-6.100.

Iino, Tadashi: *See—*
Suzuki, Yoshiyuki; Aoki, Kunimitsu; and Iino, Tadashi, 4,999,011, Cl. 353-14.000.
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Iizuka, Kazuo, to Canon Kabushiki Kaisha. Reticle conveying device. 4,999,671, Cl. 355-97.000.

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Ikada, Yoshito; Konishi, Hikaru; Corretge, Eugene; and Imamura, Kazuo, to Asahi Kasei Kogyo Kabushiki Kaisha. Regenerated cellulose membrane and processes for preparation thereof. 4,999,110, Cl. 210-490.000.

Ilardi, Joseph M.; and Gollomp, Bernard P., to Allied-Signal Inc. Electronic device for managing and dissipating heat and for improving inspection and repair, and method of manufacture thereof. 4,999,740, Cl. 361-386.000.

Illinois Tool Works, Inc.: *See—*
Hasan, Syed R.; and Beach, John R., 4,998,662, Cl. 227-111.000.

Iltis, Alain; and Maestro, Patrick, to Rhone-Poulenc Chimie. Preparation of rare earth borides. 4,999,176, Cl. 423-289.000.

Imai, Kaname: *See—*
Ara, Mari; Sawamoto, Hideo; and Imai, Kaname, 4,999,770, Cl. 364-200.000.

Imai, Kiyoshi, to NDC Company Ltd. Bearing material for an internal combustion engine and compressor. 4,999,257, Cl. 428-555.000.

Imamoto, Hiroshi, to Omron Tateisi Electronics Co. Semiconductor quantum well laser. 4,999,844, Cl. 372-45.000.

Imamura, Kazunori: *See—*
Hayano, Fuminori; Imamura, Kazunori; Murata, Sunao; and Kato, Kinya, 4,999,510, Cl. 250-571.000.

Imamura, Kazuo: *See—*
Ikada, Yoshito; Konishi, Hikaru; Corretge, Eugene; and Imamura, Kazuo, 4,999,110, Cl. 210-490.000.

Imi-Tech Corporation: *See—*
Ferro, Gregory A., 4,999,070, Cl. 156-85.000.

Imperial Chemical Industries PLC: *See—*
Anthony, Vivienne M.; Clough, John M.; Godfrey, Christopher R. A.; and Wiggins, Thomas E., 4,999,042, Cl. 71-88.000.

Beck, Michael W., 4,998,478, Cl. 102-275.700.
Boyle, Francis T.; and Matusiak, Zbigniew S., 4,999,364, Cl. 514-340.000.
Caulkett, Peter W. R.; Cooper, Michael J.; Eakin, Murdoch; and Jones, Geraint, 4,999,377, Cl. 514-507.000.
Crowley, Patrick J.; Glen, Alasdair T.; and Spence, Rosamund A., 4,999,381, Cl. 514-618.000.
Doroszkowski, Andrew; Toynton, Michael A.; and Butler, Peter, 4,999,091, Cl. 204-14.100.
Elliott, Raymond; Dalziel, John; and Sunley, Raymond L., 4,999,043, Cl. 71-92.000.
Richardson, Peter J.; and Tury, Bernard, 4,999,250, Cl. 428-457.000.
Rothon, Roger N.; Ryan, Thomas A.; and Tavener, Phillip J., 4,999,387, Cl. 523-205.000.

INA Bearing Company: *See—*
Behrens, Mark B., 4,998,346, Cl. 29-898.610.

Inada, Shuji; Ohba, Toshihiro; Kishishita, Hiroshi; and Uede, Hisashi, to Sharp Kabushiki Kaisha. Driving method of thin film EL display unit and driving circuit thereof. 4,999,618, Cl. 340-781.000.

Inagaki, Hiroyuki: *See—*
Morozumi, Eiichi; Tsumura, Takashi; and Inagaki, Hiroyuki, 4,998,561, Cl. 137-630.140.

Inagaki, Yoshio; Adachi, Keiichi; and Yabe, Masao, to Fuji Photo Film Co., Ltd. Optical information recording medium. 4,999,281, Cl. 430-495.000.

Inaji, Toshio: *See—*
Onodera, Hiromi; Inaji, Toshio; Yoshiura, Tsukasa; Wakabayashi, Noriaki; Mitani, Hiroshi; and Tokura, Mitsuo, 4,999,558, Cl. 318-685.000.

Inayama, Takayuki: *See—*
Kuwabara, Ken-ichi; Ishigaki, Kunio; and Inayama, Takayuki, 4,999,276, Cl. 430-264.000.

Inco Alloys Limited: *See—*
Jones, Trevor D., 4,998,341, Cl. 29-828.000.

Incremona, Joseph H.; and Lundeen, Richard H., to Minnesota Mining and Manufacturing Company. Dry transfer graphics article method of preparation. 4,999,076, Cl. 156-241.000.

Infeld, Martin H.: *See—*
Bachynsky, Maria O.; Infeld, Martin H.; Margolis, Richard J.; and Perla, Dennis A., 4,999,375, Cl. 514-455.000.

Ingersoll-Rand Company: *See—*
Hutchinson, William R., 4,998,862, Cl. 417-28.000.
Westman, Jan E., 4,998,331, Cl. 28-295.000.

Inglese, James: *See—*
Benkovic, Stephen J.; Blatchly, Richard A.; and Inglese, James, 4,999,424, Cl. 536-22.000.

Ingman, Thomas M., to Condor, Inc. AC line filter with tapped balun winding. 4,999,594, Cl. 333-181.000.

Ingrum, Jerry G.: *See—*
Littlejohn, Douglas J.; Modlin, Douglas; Ingrum, Jerry G.; and Devlin, Brian R., 4,998,824, Cl. 356-407.000.

Inland Steel Company: *See—*
Coduti, Phillip L.; and McDaniel, Louis, 4,999,241, Cl. 428-340.000.

Innovative Controls, Incorporated: *See—*
Ottenstein, Sidney A., 4,999,547, Cl. 315-307.000.

Inoue, Atsuhisa: *See—*
Akagi, Yoshiro; Ishino, Mariko; Inoue, Atsuhisa; Kaminishi, Shigeru; and Taniguchi, Hiroshi, 4,999,215, Cl. 427-41.000.

Inoue, Kazushiro: *See—*
Koishi, Masaru; Yonezawa, Tomoyuki; Enomoto, Hiroshi; and Inoue, Kazushiro, 4,999,003, Cl. 280-103.000.

Inoue, Kenji, to Shinko Electric Co., Ltd. Integration proportional controller in servo-control system. 4,999,557, Cl. 318-609.000.

Inoue, Nobuaki: *See—*
Kasama, Yasuo; and Inoue, Nobuaki, 4,999,275, Cl. 430-264.000.

Inoue, Seiji; and Tanaka, Seiichi, to Sanshin Kogyo Kabushika Kaisha. Ignition timing control for outboard motor. 4,998,521, Cl. 123-424.000.

Institut Elektrosvarki Imeni E. O. Patona Akademii Nauk USSR: *See—*
Kuchuk-Yatsenko, Sergei I.; Krivenko, Valery G.; Kuznetsov, Petr V.; Bogatyrev, Vladimir J.; Golovchenko, Sergei I.; and Ignatenko, Vadim J., 4,999,476, Cl. 219-97.000.

Integrated Fluidics, Inc.: *See—*
Brackett, Tom S.; and Webster, Milo E., 4,999,069, Cl. 156-84.000.

Intel Corporation: *See—*
Park, Chin S.; and Castro, Herman A., 4,999,525, Cl. 307-201.000.

Interlego A.G.: *See—*
Bolli, Peter; and Tanner, Werner, 4,998,903, Cl. 446-102.000.

International Business Machines Corporation: *See—*
Barth, John E., Jr.; Drake, Charles E.; Hovis, William P.; Kalter, Howard L.; Kelley, Gordon A., Jr.; Lewis, Scott C.; Nickel, Daniel J.; and Yankosky, James A., 4,999,815, Cl. 365-230.060.
Beaman, Brian S., 4,998,885, Cl. 439-66.000.
Beha, Johannes G.; Blacha, Armin U.; Clauberg, Rolf; and Seitz, Hugo K., 4,999,577, Cl. 324-158.00R.
Boerstler, David W.; and Stigliani, Daniel J., Jr., 4,998,792, Cl. 350-96.150.
Bonnell, Ralph E.; Castello, George C.; and Hoebener, Karl G., 4,998,342, Cl. 29-840.000.
Christie, Frederick R.; Papathomas, Kostas I.; and Wang, David W., 4,999,699, Cl. 357-65.000.
Cocanougher, Daniel; Montoye, Robert K.; Nguyenphu, Myhong; and Runyon, Stephen L., 4,999,802, Cl. 364-748.000.
Costes, Michel; Gach, Alain; Hartmann, Yves; and Peyronnenc, Michel, 4,999,769, Cl. 364-200.000.
Dhong, Sang H.; Chen, Chih-Liang; and Shin, Hyun J., 4,999,518, Cl. 307-446.000.
Hiraoka, Hiroyuki, 4,999,280, Cl. 430-330.000.
Leo, Robert P.; McColgan, Mark W.; Stockman, James E., III; and Young, Jeffrey H., 4,999,834, Cl. 370-94.100.
Peters, Anthony M.; and Sehorne, Mark A., 4,999,766, Cl. 364-200.000.
Reynolds, Frank S.; and Ricci, Louis W., 4,999,837, Cl. 371-3.000.

International Flavors & Fragrances Inc.: *See—*
Buckholz, Lawrence, Jr.; Farbood, Mohamad I.; Kossiakoff, Nicolas; and Scharpf, Lewis G., 4,999,207, Cl. 426-536.000.
Sprecker, Mark A.; Belko, Robert P.; Hanna, Marie R.; Beck, Charles E. J.; and Brucato, Salvatore M., 4,999,439, Cl. 549-397.000.

International Group, Inc., The: *See—*
Maletsky, Albert; Nolan, Denis P.; and Polito, Betty Jean, 4,998,928, Cl. 604-365.000.

International Integrated Systems, Inc.: *See—*
Littlejohn, Douglas J.; Modlin, Douglas; Ingrum, Jerry G.; and Devlin, Brian R., 4,998,824, Cl. 356-407.000.

International Sensor Technology, Inc.: *See—*
Braunlich, Peter F.; Tetzlaff, Wolfgang; Hegland, Joel E.; and Jones, Scott C., 4,999,504, Cl. 250-484.100.

Iowa State University Research Foundation, Inc.: *See—*
Holzapfel, Robert C.; Mottet, Michael P.; and Riggle, Thomas W., 4,998,394, Cl. 52-426.000.

Irick, Virgil, Jr.: *See—*
Dwivedi, Ratnesh K.; and Irick, Virgil, Jr., 4,998,578, Cl. 164-6.000.

Irvin Automotive Products, Inc.: *See—*
Spier, Eric A., 4,999,599, Cl. 335-207.000.

Irwin, Gregory D.; and Franke, Norman C., to Outboard Marine Corporation. Internal combustion engine with silencer supported carburetor control member. 4,998,516, Cl. 123-198.00E.

Ishibashi, Tamotsu: *See—*
Gamo, Gotaro; and Ishibashi, Tamotsu, 4,999,473, Cl. 219-69.120.

Ishigaki, Kunio: *See—*
Kuwabara, Ken-ichi; Ishigaki, Kunio; and Inayama, Takayuki, 4,999,276, Cl. 430-264.000.

Ishii, Akio: *See—*
Oshima, Etsuo; Obase, Hiroyuki; Karasawa, Akira; Kubo, Kazuhiro; Miki, Ichiro; and Ishii, Akio, 4,999,363, Cl. 514-332.000.

Ishii, Atsujiro: *See—*
Uzawa, Tsutomu; Ishii, Atsujiro; and Aoki, Norihiko, 4,998,807, Cl. 350-423.000.

Ishii, Atsujirou: *See—*
Aoki, Norihiko; Tsuchida, Hirofumi; and Ishii, Atsujirou, 4,999,007, Cl. 350-426.000.

Ishii, Satoshi: *See—*
Ishizuka, Koh; Nishimura, Tetsuharu; Ishii, Satoshi; Kubota, Yoichi; and Tsukiji, Masaaki, 4,998,798, Cl. 350-115.000.

Ishii, Takaaki: *See—*
Hirao, Yoshichika; Hosoya, Nobukazu; Ishii, Takaaki; and Amino, Tadashi, 4,999,707, Cl. 358-153.000.

Ishii, Takatoshi, to ASCII Corporation. Apparatus for storing and accessing image data to be displayed on a display unit. 4,999,620, Cl. 340-799.000.

Ishii, Yoshibumi: *See—*
Kawashima, Shigeru; Ide, Hiroshi; Kato, Kazuaki; Magara, Mitsuo; and Ishii, Yoshibumi, 4,999,058, Cl. 127-29.000.
Tateno, Yoshiaki; Yoneda, Susumu; Okamoto, Naoki; Ishii, Yoshibumi; and Kato, Kazuaki, 4,999,090, Cl. 203-36.000.

Ishijima, Hiroshi: *See—*
Miyata, Chikara; Yasutake, Masatoshi; and Ishijima, Hiroshi, 4,999,495, Cl. 250-306.000.

Ishikawa Gasket Co. Ltd.: *See—*
Udagawa, Tsunekazu, 4,998,741, Cl. 277-235.00B.

Ishikawa, Katsukiyo: *See—*
Seio, Mamoru; Nishijima, Kanji; and Ishikawa, Katsukiyo, 4,999,274, Cl. 430-190.000.

Ishikawa, Kouji; Kawano, Kyoichiro; Murase, Teruo; Sochor, Jerzy R.; and Norman, C. Timothy, to Fujitsu Limited; and Amdahl Corporation. Connector apparatus for high density coaxial cables. 4,998,884, Cl. 439-49.000.

Ishiko, Daisuke; Toda, Kazurou; Kamada, Osamu; and Miura, Akihiro, to Matsushita Electric Industrial Co., Ltd.; and Kansai Electric Power Co., Inc. Current and/or voltage detector for a distribution system. 4,999,571, Cl. 324-96.000.

Ishino, Mariko: *See—*
Akagi, Yoshiro; Ishino, Mariko; Inoue, Atsuhisa; Kaminishi, Shigeru; and Taniguchi, Hiroshi, 4,999,215, Cl. 427-41.000.

Ishiwata, Ichiro; and Karasuyama, Tomomichi, to Nippon Air Brake Co., Ltd. Two-part plastic piston with excess resin receiving groove. 4,998,461, Cl. 92-248.000.

Ishiwata, Shinichi; Ueyama, Michio; Nakae, Hiroyuki; Funayama, Yoshiyuki; Iwamoto, Kazushige; and Noguchi, Isamu, to Furukawa Electric Co., Ltd. Radiation-curable adhesive tape. 4,999,242, Cl. 428-345.000.

Ishizuka, Koh; Nishimura, Tetsuharu; Ishii, Satoshi; Kubota, Yoichi; and Tsukiji, Masaaki, to Canon Kabushiki Kaisha. Encoder having long length measuring stroke. 4,998,798, Cl. 350-115.000.

Isobe, Kimiyasu: *See—*
Akiba, Tetsunori; Yamaguchi, Shotaro; Suzuki, Satoru; Isobe, Kimiyasu; and Matsunaga, Kuniyoshi, 4,999,289, Cl. 435-19.000.

Isono, Keinosuke: *See—*
Suzuki, Tatsuo; and Isono, Keinosuke, 4,998,400, Cl. 53-425.000.

Isuzu Ceramics Research Institute Co., Ltd.: *See*—
Kawamura, Hideo, 4,998,951, Cl. 60-608.000.
Isuzu Motors: *See*—
Kawamura, Hideo, 4,998,517, Cl. 123-270.000.
Itagaki, Tatsuo: *See*—
Nihei, Masayasu; Onuki, Jin; Koubuchi, Yasushi; Miyazaki, Kunio; and Itagaki, Tatsuo, 4,999,096, Cl. 204-192.300.
Ito, Hiroaki: *See*—
Igarashi, Ichiro; and Ito, Hiroaki, 4,998,564, Cl. 138-126.000.
Ito, Satoshi: *See*—
Hashimoto, Misao; Ito, Satoshi; Miyajima, Shunpei; Ito, Wataru; and Komori, Tadashi, 4,999,259, Cl. 428-685.000.
Ito, Wataru: *See*—
Hashimoto, Misao; Ito, Satoshi; Miyajima, Shunpei; Ito, Wataru; and Komori, Tadashi, 4,999,259, Cl. 428-685.000.
Ito, Yuji; and Miyamoto, Moritoshi, to Canon Kabushiki Kaisha. Particle measuring apparatus. 4,999,513, Cl. 250-575.000.
Itoh, Akira: *See*—
Emoto, Kazuhiro; Haino, Kozo; Itoh, Akira; and Okaji, Makoto, 4,999,269, Cl. 430-58.000.
Itoh, Kiyoo: *See*—
Kitsukawa, Goro; Yanagisawa, Kazumasa; Kawahara, Takayuki; Hori, Ryoichi; Nakagome, Yoshinobu; Hamma, Noriyuki; Itoh, Kiyoo; and Tukada, Hiromi, 4,999,519, Cl. 307-446.000.
Itoh, Kohji: *See*—
Azuma, Hiroshi; Takemura, Kenji; and Itoh, Kohji, 4,999,530, Cl. 310-12.000.
Itoi, Hideyuki; Yoshimura, Ryoji; and Kaizuka, Tsuneo, to Nippon Electric Glass Co., Ltd. Method and apparatus for manufacture of thin sheet glass. 4,999,039, Cl. 65-54.000.
ITT Corporation: *See*—
Duggan, Daniel D., 4,999,211, Cl. 427-8.000.
Foglesonger, John D.; and Vranson, David M., 4,998,584, Cl. 165-171.000.
Lee, William C., 4,999,833, Cl. 370-94.100.
Shiley, Robert J., 4,998,892, Cl. 439-381.000.
Iwakura, Ken: *See*—
Usami, Toshimasa; Hatakeyama, Seiji; Shimomura, Akihiro; and Iwakura, Ken, 4,999,333, Cl. 503-209.000.
Iwamoto, Kazushige: *See*—
Ishiwata, Shinichi; Ueyama, Michio; Nakae, Hiroyuki; Funayama, Yoshiyuki; Iwamoto, Kazushige; and Noguchi, Isamu, 4,999,242, Cl. 428-345.000.
Iwanaga, Toshiaki: *See*—
Tounai, Syuichi; and Iwanaga, Toshiaki, 4,998,830, Cl. 384-563.000.
Iwasa, Koji: *See*—
Kamamori, Hitoshi; Iwasa, Koji; Suginoya, Mitsuru; Sano, Yutaka; Terada, Yumiko; and Kato, Naoki, 4,999,094, Cl. 204-180.200.
Iwasa, Seiji: *See*—
Chida, Shohei; Kozaki, Masami; Asahi, Toshinori; Ono, Chiyoaki; Iwasa, Seiji; Fukunaga, Taizou; and Takemura, Moriyuki, 4,998,776, Cl. 299-59.000.
Iwasaki, Toshio: *See*—
Ueda, Ryuichi; Nakamura, Masaaki; Iwasaki, Toshio; Hirota, Kanji; and Nakamura, Tetsuya, 4,999,614, Cl. 340-588.000.
Iwata, Masahiro: *See*—
Yamanoi, Yukio; Kandachi, Mitsuo; Iwata, Masahiro; and Kato, Kazumi, 4,998,429, Cl. 72-283.000.
Izaki, Takeshi: *See*—
Kuwabara, Satoru; Izaki, Takeshi; Sakakibara, Kenji; and Kobayashi, Masanari, 4,999,666, Cl. 355-27.000.
Izumi, Shuji: *See*—
Kuroda, Hirokazu; Nakai, Masaaki; Katoh, Takehiro; Ohya, Tetsuro; Izumi, Shuji; and Okuno, Akira, 4,999,665, Cl. 354-468.000.
Izydore, Robert A.; and Hall, Iris H., to North Carolina Central Univ., The; and Univ. of North Carolina at Chapel Hill, The. Isoxazolidine-3,5-diones, pharmaceutical compositions and method of treatment. 4,999,366, Cl. 514-380.000.
J. & P. Coats, Limited: *See*—
Aitken, John; and Fletcher, John, 4,998,492, Cl. 112-303.000.
J-W Operating Company: *See*—
Gagnon, James J., 4,998,513, Cl. 123-76.000.
Jackson, John E.; McCaslin, Lynn M.; Stavros, Anthony J.; and Tucker, Robert C., Jr., to Union Carbide Coatings Service Technology Corporation. Tungsten chromium carbide-nickel coatings for various articles. 4,999,255, Cl. 428-552.000.
Jacobs, William G., to Seagate Technology, Inc. Automatic disc gauging and sorting apparatus. 4,998,987, Cl. 209-552.000.
Jaeger, Thomas; and Wasek, Raymond T., to Becton, Dickinson and Company. Multiplate subculture solid media devices. 4,999,303, Cl. 435-300.000.
Jahoda, Frantisek. Judo training device. 4,998,719, Cl. 272-76.000.
Jain, Anil K.; and Pruden, Barry B., to Petro-Canada Inc. Hydrocracking of heavy oils in presence of petroleum coke derived from heavy oil coking operations. 4,999,328, Cl. 502-151.000.
Jalava, Jouko S.: *See*—
Jappinen, Kalervo A.; Hakala, Marja-Riitta; Jalava, Jouko S.; and Lehto, Ari, 4,998,431, Cl. 73-1.00G.
Janiszewski, Grzegorz, to AB Volvo. Control system for automatic gearboxes in which gear changes are effected stepwise. 4,998,443, Cl. 74-335.000.
Jannesari, Michael J.; and Fabian, Alan N., to Onan Corporation. Three-position actuating mechanism for transfer switch. 4,999,598, Cl. 335-122.000.
Janome Sewing Machine Co. Ltd.: *See*—
Hanyu, Susumu; Kasuga, Noboru; Hara, Kazumasa; and Morimoto, Shuzo, 4,998,491, Cl. 112-262.100.
Janome Sewing Machine Industry Co., Ltd.: *See*—
Hisatake, Michio; Kongo, Takeshi; Sasako, Hidenori; and Ebata, Yoshikazu, 4,998,489, Cl. 112-103.000.
Jappinen, Kalervo A.; Hakala, Marja-Riitta; Jalava, Jouko S.; and Lehto, Ari, to Vaisala OX. Field usable calibrator for humidity meters. 4,998,431, Cl. 73-1.00G.
Jauch, Kurt. Automatic lathe for machining work bars. 4,998,455, Cl. 82-127.000.
Jechel, Kurt E.; and Schutzler, Jerome C., to PDA Engineering. Glass laminated structure, laminating apparatus, and methodology. 4,999,246, Cl. 428-192.000.
Jelenek, Ivan: *See*—
Ralph, John T.; Beckley, Guy B.; Brady, Frank T.; Jelenek, Ivan; Korn, Darryl K.; Meyer, John; Nay, Daniel L.; Searle, Colin M.; Shick, David; Williams, Richard W.; and Wilson, Jon C., deceased, 4,999,771, Cl. 364-200.000.
Jensen, Thomas C.: *See*—
Johnson, Roger E.; Jensen, Thomas C.; VanRossen, Edward C.; and O'Donnell, Kevin M., 4,998,769, Cl. 296-183.000.
Jett-Tilton, Marti; and Alving, Carl R., to United States of America, Army. Phosphatidyl treatment of rapidly proliferating cells. 4,999,344, Cl. 514-77.000.
Jewell, Jack L.: *See*—
Huang, Kai-Feng; Jewell, Jack L.; McCall, Samuel L., Jr.; and Tai, Kuochou, 4,999,842, Cl. 372-45.000.
Jinnouchi, Takeshi: *See*—
Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,998,867, Cl. 418-256.000.
Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,998,868, Cl. 418-257.000.
Joblonicky, Bruce A.: *See*—
Rice, Owen, Jr.; and Joblonicky, Bruce A., 4,999,672, Cl. 355-202.000.
Joh. Vaillant GmbH und Co.: *See*—
Schilling, Jurgen; Reichmann, Horst; Henche, Wolfgang; Pieper, Thomas; Braun, Bernd; and Ludowisy, Hans, 4,998,877, Cl. 431-19.000.
Johansson, Eric B.; Elkins, Robert B.; Crowther, Russell L.; and Matzner, Bruce, to General Electric Company. Flow tripper in combination with spacer deflector. 4,999,153, Cl. 376-443.000.
John, Berchmans: *See*—
Scarbrough, Edward C.; Antich, Pietro P.; John, Berchmans; and Nguyen, Phuc D., 4,998,912, Cl. 600-6.000.
John, Thomas; Bock, Georg; Burger, Rainer; and Gollinger, Franz X., to Man Roland Druckmaschinen AG. Compact printing machine inker system. 4,998,475, Cl. 101-366.000.
Johno, Hideki: *See*—
Murakami, Azuma; Hagiwara, Teruyoshi; Tuchida, Yoichi; and Johno, Hideki, 4,999,461, Cl. 178-19.000.
Johnson, Delores. Protective assembly for hypodermic syringe devices. 4,998,920, Cl. 604-198.000.
Johnson, Gerald E.: *See*—
Rivera, James A.; and Johnson, Gerald E., 4,998,613, Cl. 198-335.000.
Johnson, Paul H.: *See*—
Townsend, Blue H., 4,998,651, Cl. 223-101.000.
Johnson, Robert G., Jr. Bingo game apparatus. 4,999,001, Cl. 273-269.000.
Johnson, Roger E.; Jensen, Thomas C.; VanRossen, Edward C.; and O'Donnell, Kevin M., to General Motors Corporation. Cargo box for truck. 4,998,769, Cl. 296-183.000.
Johnson, Steven M.: *See*—
McAllister, Jeffrey S.; and Johnson, Steven M., 4,999,724, Cl. 360-98.080.
Johnson, Susan G.: *See*—
Mellors, Harry; and Johnson, Susan G., 4,999,237, Cl. 428-280.000.
Johnston, Wilbur D., Jr.; Karlicek, Robert F., Jr.; Long, Judith A.; and Wilt, Daniel P., to AT&T Bell Laboratories. Method of controlling dopant incorporation in high resistivity In-based compound Group III-V epitaxial layers. 4,999,315, Cl. 439-94.000.
Joly, Ghislaine: *See*—
Regnier, Gilbert; Dhainaut, Alain; Vilaine, Jean-Paul; Villeneuve, Nicole; Joly, Ghislaine; and Duhault, Jacques, 4,999,372, Cl. 514-422.000.
Jones, Bradley A.: *See*—
Bayer, Dean M.; Harris, Curtis H.; and Jones, Bradley A., 4,998,761, Cl. 293-121.000.
Jones, Christopher W., to Delco Electronics Corporation. Automatic rear wiper control. 4,999,550, Cl. 318-50.000.
Jones, David C.; and Lee, Chi-Chang, to Du Pont de Nemours, E. I., and Company. Metallized polyethylene plexifilamentary film-fibril sheet. 4,999,222, Cl. 427-250.000.
Jones, Geraint: *See*—
Caulkett, Peter W. R.; Cooper, Michael J.; Eakin, Murdoch; and Jones, Geraint, 4,999,377, Cl. 514-507.000.
Jones, Scott C.: *See*—
Braunlich, Peter F.; Tetzlaff, Wolfgang; Hegland, Joel E.; and Jones, Scott C., 4,999,504, Cl. 250-484.100.
Jones, Trevor D., to Inco Alloys Limited. Method for making mineral insulated metal sheathed cables. 4,998,341, Cl. 29-828.000.
Jones, Winton D.; Dage, Richard C.; Claxton, George P.; Cheng, Hsien C.; and Robinson, Phillip J., to Merrell Dow Pharmaceuticals. Pro-

cess for preparing quinoline aldehyde and ketone derivatives. 4,999,431, Cl. 546-168.000.
Jordan, Fred P. Salmonid egg incubator. 4,998,505, Cl. 119-3.000.
Joseph, Brian J.; Mort, Thomas W.; Stern, Philip A.; and Westcott, Robert M., to Eastman Kodak Company. Support assembly for multiple development stations in an electrostatographic reproduction apparatus. 4,999,680, Cl. 355-326.000.
Jouppi, Norman P.: *See—*
Turrini, Silvio; Leonard, Judson S.; and Jouppi, Norman P., 4,999,803, Cl. 364-748.000.
Judson, Nancy L. Customized trip planner. 4,998,752, Cl. 283-34.000.
Jump, Adrien A.: *See—*
Hoffman, Wayne L.; and Jump, Adrien A., 4,999,340, Cl. 514-23.000.
Jung, Alfred: *See—*
Leitz, Edgar; Bottenbruch, Ludwig; Ott, Karl-Heinz; Jung, Alfred; and Grigo, Ulrich, 4,999,420, Cl. 528-371.000.
Jungheinrich Unternehmensverwaltung KG, Firma: *See—*
Magens, Ernst-Peter, 4,998,858, Cl. 414-495.000.
Jurkewitz, Manfred: *See—*
Rodi, Anton; Hauck, Dieter; Lehnert, Michael; and Jurkewitz, Manfred, 4,998,472, Cl. 101-216.000.
Kabata, Toshiyuki; Ohsawa, Toshiyuki; Yoneyama, Sachiko; and Kimura, Okitoshi, to Ricoh Company, Ltd. Sheet-shaped electrode, method or producing the same, and secondary battery. 4,999,263, Cl. 429-131.000.
Kabushiki Kaisha Denkosha: *See—*
Koda, Yoshiharu; and Takashima, Tadashi, 4,999,546, Cl. 315-225.000.
Kabushiki Kaisha Kobe Seiko Sho: *See—*
Chida, Shohei; Kozaki, Masami; Asahi, Toshinori; Ono, Chiyoaki; Iwasa, Seiji; Fukunaga, Taizou; and Takemura, Moriyuki, 4,998,776, Cl. 299-59.000.
Kabushiki Kaisha Meidensha: *See—*
Kaizu, Hideo; and Kaneko, Kimihiko, 4,998,436, Cl. 73-117.000.
Kabushiki Kaisha Mimura Sogo Kenkyuusho: *See—*
Mimura, Shinji, 4,998,918, Cl. 604-132.000.
Kabushiki Kaisha Miyanaga: *See—*
Miyanaga, Masaaki, 4,998,981, Cl. 175-286.000.
Kabushiki Kaisha Sankyo Seiki Seisakusho: *See—*
Kasuga, Ikuo; Kamada, Toru; and Kobayashi, Fumio, 4,998,802, Cl. 350-247.000.
Kabushiki Kaisha Toaki-Rika-Denki-Seisakusho: *See—*
Yamamoto, Toshimasa, 4,998,680, Cl. 242-54.00R.
Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho: *See—*
Mori, Shinji, 4,998,684, Cl. 242-107.40A.
Tanaka, Kohbun, 4,998,328, Cl. 24-639.000.
Kabushiki Kaisha Toshiba: *See—*
Fukunishi, Souhei, 4,998,971, Cl. 128-6.000.
Fukuyasu, Shigeki; Nakamura, Makoto; Kawachi, Kyozo; Yamaguchi, Seiji; Kinoshita, Sakan; and Numata, Tadashi, 4,999,203, Cl. 426-46.000.
Kikuchi, Katsuya, 4,998,973, Cl. 128-6.000.
Mizutani, Hiroyuki; and Moriyasu, Takashi, 4,999,786, Cl. 364-513.000.
Morishima, Yoichi; Kobayashi, Kazuo; and Suzuki, Isao, 4,999,560, Cl. 318-779.000.
Ohtsuka, Nobuaki; Miyamoto, Junichi; and Atsumi, Shigeru, 4,999,813, Cl. 365-201.000.
Okamoto, Tsuguhiko, 4,999,483, Cl. 250-203.100.
Ota, Naoki, 4,998,626, Cl. 209-584.000.
Satoh, Kozo, 4,999,581, Cl. 324-309.000.
Sugimoto, Yasuhiro, 4,999,631, Cl. 341-156.000.
Kabushiki Kaisha Yaskawa Denki Seisakusho: *See—*
Tounai, Syuichi; and Iwanaga, Toshiaki, 4,998,830, Cl. 384-563.000.
Kaga, Atsushi; and Nakamoto, Masahiko, to Mitsubishi Denki Kabushiki Kaisha. Variable-speed driving system. 4,999,561, Cl. 318-812.000.
Kagami, Yuji: *See—*
Suzuki, Takeshi; and Kagami, Yuji, 4,999,016, Cl. 400-88.000.
Kageyama, Hidehei; and Mitsuya, Yoshihide, to Kotobuki & Co., Ltd. Lead cartridge with an openable capping structure. 4,998,837, Cl. 401-85.000.
Kahler, Brett D.; and McKim, Matthew P. Biological contact gas scrubber for waste gas purification. 4,999,302, Cl. 435-266.000.
Kainou, Toshikuni: *See—*
Kurihara, Takashi; Matsumoto, Shiro; Kainou, Toshikuni; Kanbara, Hirohisa; and Kubodera, Kenichi, 4,999,139, Cl. 252-587.000.
Kaizu, Hideo; and Kaneko, Kimihiko, to Kabushiki Kaisha Meidensha. Belt supporting structure for bench testing apparatus. 4,998,436, Cl. 73-117.000.
Kaizuka, Tsuneo: *See—*
Itoi, Hideyuki; Yoshimura, Ryoji; and Kaizuka, Tsuneo, 4,999,039, Cl. 65-54.000.
Kakubo, Yuji; and Sotome, Hiromi, to Yamaha Corporation. Analog-to-digital converting unit with broad dynamic range. 4,999,628, Cl. 341-139.000.
Kakuda, Tunenari, to Fuji Photo Film Co., Ltd. Web electricity removing roller. 4,999,733, Cl. 361-213.000.
Kalamazoo Holdings, Inc.: *See—*
Todd, Paul H., Jr., 4,999,205, Cl. 426-250.000.
Kalinowski, Paul W.: *See—*
Bouchard, William L.; Cummings, Robert E.; Kalinowski, Paul W.; and Sudol, Charles W., 4,998,384, Cl. 51-168.000.
Kallianos, Andrew G.; Lilly, A. Clifton, Jr.; Whidby, Jerry F.; and Dwyer, Rowland W., Jr., to Philip Morris Incorporated. Wrapper for smoking articles and method for preparing same. 4,998,542, Cl. 131-365.000.
Kalter, Howard L.: *See—*
Barth, John E., Jr.; Drake, Charles E.; Hovis, William P.; Kalter, Howard L.; Kelley, Gordon A., Jr.; Lewis, Scott C.; Nickel, Daniel J.; and Yankosky, James A., 4,999,815, Cl. 365-230.060.
Kalthoff, Timothy V.: *See—*
Burt, Rodney T.; Kalthoff, Timothy V.; Heisley, David A.; and Stitt, R. Mark, II, 4,999,585, Cl. 332-149.000.
Kamada, Osamu: *See—*
Ishiko, Daisuke; Toda, Kazurou; Kamada, Osamu; and Miura, Akihiro, 4,999,571, Cl. 324-96.000.
Kamada, Toru: *See—*
Kasuga, Ikuo; Kamada, Toru; and Kobayashi, Fumio, 4,998,802, Cl. 350-247.000.
Kamamori, Hitoshi; Iwasa, Koji; Suginoya, Mitsuru; Sano, Yutaka; Terada, Yumiko; and Kato, Naoki, to Seiko Instruments & Electronics Ltd. Method for manufacturing a color member. 4,999,094, Cl. 204-180.200.
Kaminade, Tadahiro; Iida, Shigeki; Toya, Tomohiro; and Hara, Hajime, to Nippon Oil Company, Limited. Wholly aromatic polyesters. 4,999,416, Cl. 528-190.000.
Kaminishi, Shigeru: *See—*
Akagi, Yoshiro; Ishino, Mariko; Inoue, Atsuhisa; Kaminishi, Shigeru; and Taniguchi, Hiroshi, 4,999,215, Cl. 427-41.000.
Kamitani, Masatoshi; and Fujiwara, Toshihiro, to Minolta Camera Kabushiki Kaisha. Viewfinder of the real image type. 4,999,658, Cl. 354-225.000.
Kamiyama, Katsumi; and Igawa, Kazushige, to Tosoh Corporation. Removal of nitric oxides by copper-containing zeolites. 4,999,173, Cl. 423-239.000.
Kampe, Klaus-Dieter; Usinger, Patricia; Siegel, Herbert; Alpermann, Hans G.; and Gerhards, Hermann J., to Hoechst Aktiengesellschaft. 1-(1-aryl-2-hydroxyethyl)-imidazoles and salts thereof, medicaments containing these compounds, and the use thereof. 4,999,352, Cl. 514-235.800.
Kanai, Masahiro: *See—*
Murakami, Tsutomu; and Kanai, Masahiro, 4,998,503, Cl. 118-723.000.
Kanamaru, Masahiko, to Yokohama Rubber Co., Ltd., The. Heavy loading tubless tire with defined polygonal section bead core. 4,998,575, Cl. 152-540.000.
Kanbara, Hirohisa: *See—*
Kurihara, Takashi; Matsumoto, Shiro; Kainou, Toshikuni; Kanbara, Hirohisa; and Kubodera, Kenichi, 4,999,139, Cl. 252-587.000.
Kanda, Minoru; Komatsu, Mikio; Fujii, Yasuhiro; Abiko, Toshio; Masamoto, Kyoji; Ogawa, Yasumasa; and Hashimoto, Tuyoshi, to Matsushita Electric Works, Ltd. Converter for planar antenna. 4,999,592, Cl. 333-26.000.
Kandachi, Mitsuo: *See—*
Yamanoi, Yukio; Kandachi, Mitsuo; Iwata, Masahiro; and Kato, Kazumi, 4,998,429, Cl. 72-283.000.
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See—*
Yamamoto, Sumio; and Sakurai, Shinichi, 4,999,402, Cl. 525-305.000.
Kaneko, Kimihiko: *See—*
Kaizu, Hideo; and Kaneko, Kimihiko, 4,998,436, Cl. 73-117.000.
Kaneko, Yutaka, to Ricoh Company, Ltd. Multi-chip type image sensor. 4,999,484, Cl. 250-208.100.
Kanjolia, Ravi K.; and Hui, Benjamin C., to CVD Incorporated. Chemical vapor deposition and chemicals with diarsines and polyarsines. 4,999,223, Cl. 427-252.000.
Kansai Electric Power Co., Inc.: *See—*
Ishiko, Daisuke; Toda, Kazurou; Kamada, Osamu; and Miura, Akihiro, 4,999,571, Cl. 324-96.000.
Kansas State University Research Foundation: *See—*
Fina, Louis R.; Lambert, Jack L.; and Bridges, Ronald L., 4,999,190, Cl. 424-79.000.
Kanzaka, Yoshiro, to Yoshida Kogyo K.K. Apparatus for delivering button body. 4,998,660, Cl. 227-18.000.
Kao Corporation: *See—*
Nebashi, Tutomu; Yabe, Shinichi; Yamaguchi, Nobuyoshi; Takizawa, Shuichi; and Sai, Fumio, 4,999,138, Cl. 252-543.000.
Kao, Jamee; and Hsu, Joseph. Honeycomb pleater. 4,999,073, Cl. 156-197.000.
Kao, Sun-Chueh; and Karol, Frederick J., to Union Carbide Chemicals and Plastics Company Inc. Catalyst for regulating the molecular weight distribution of ethylene polymers. 4,999,327, Cl. 502-119.000.
Karapiperis, Leonidas: *See—*
Pribat, Didier; and Karapiperis, Leonidas, 4,999,314, Cl. 437-89.000.
Karasawa, Akira: *See—*
Oshima, Etsuo; Obase, Hiroyuki; Karasawa, Akira; Kubo, Kazuhiro; Miki, Ichiro; and Ishii, Akio, 4,999,363, Cl. 514-332.000.
Karasuyama, Tomomichi: *See—*
Ishiwata, Ichiro; and Karasuyama, Tomomichi, 4,998,461, Cl. 92-248.000.
Kardon Industries, Inc.: *See—*
Zinnbauer, Gerald, 4,998,988, Cl. 215-230.000.
Karlicek, Robert F., Jr.: *See—*
Johnston, Wilbur D., Jr.; Karlicek, Robert F., Jr.; Long, Judith A.; and Wilt, Daniel P., 4,999,315, Cl. 439-94.000.

Karnopp, Dean C.; and Yasui, Yoshiyuki, to Aisin Seiki Kabushiki Kaisha. Steering and brake controlling system. 4,998,593, Cl. 180-140.000.
Karol, Frederick J.: *See*—
Kao, Sun-Chueh; and Karol, Frederick J., 4,999,327, Cl. 502-119.000.
Karolyi, Oskar, to Michael Horauf Maschinenfabrik GmbH & Co. KG. Container folded from a blank. 4,998,669, Cl. 229-170.000.
Kas Products, Inc.: *See*—
Scharnberg, Lorne C., 4,998,536, Cl. 128-800.000.
Kasama, Yasuo; and Inoue, Nobuaki, to Fuji Photo Film Co., Ltd. Silver halide photographic light-sensitive material. 4,999,275, Cl. 430-264.000.
Kashiwagi, Akihiro; and Kijima, Takao, to Mazda Motor Corporation. Vehicle suspension system. 4,998,748, Cl. 280-690.000.
Kaspar, Melvin: *See*—
Kostos, Jeffery; Kaspar, Melvin; and Artwohl, Paul, 4,998,382, Cl. 49-501.000.
Kasuga, Ikuo; Kamada, Toru; and Kobayashi, Fumio, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Objective lens driving device in an optical pickup. 4,998,802, Cl. 350-247.000.
Kasuga, Noboru: *See*—
Hanyu, Susumu; Kasuga, Noboru; Hara, Kazumasa; and Morimoto, Shuzo, 4,998,491, Cl. 112-262.100.
Kataoka, Yoshitoshi: *See*—
Sato, Masayuki; Kobayashi, Noriyuki; Funamoto, Akihiko; and Kataoka, Yoshitoshi, 4,999,442, Cl. 556-14.000.
Katerberg, James A.; and Pipkorn, David N., to Eastman Kodak Company. User selectable drop charge synchronization for traveling wave-stimulated, continuous ink jet printers. 4,999,644, Cl. 346-1.100.
Katerberg, James A.: *See*—
Wood, Wendell L.; Morris, Brian G.; Aleshire, Dianne J.; and Katerberg, James A., 4,999,647, Cl. 346-75.000.
Kato, Akira: *See*—
Nishio, Hiroaki; Kato, Akira; and Nakamura, Sazo, 4,999,157, Cl. 419-68.000.
Kato, Kazuaki: *See*—
Kawashima, Shigeru; Ide, Hiroshi; Kato, Kazuaki; Magara, Mitsuo; and Ishii, Yoshibumi, 4,999,058, Cl. 127-29.000.
Tateno, Yoshiaki; Yoneda, Susumu; Okamoto, Naoki; Ishii, Yoshibumi; and Kato, Kazuaki, 4,999,090, Cl. 203-36.000.
Kato, Kazumi: *See*—
Yamanoi, Yukio; Kandachi, Mitsuo; Iwata, Masahiro; and Kato, Kazumi, 4,998,429, Cl. 72-283.000.
Kato, Kinya: *See*—
Hayano, Fuminori; Imamura, Kazunori; Murata, Sunao; and Kato, Kinya, 4,999,510, Cl. 250-571.000.
Kato, Masatake: *See*—
Shiraishi, Akihiko; Fujibayashi, Kazuo; and Kato, Masatake, 4,998,801, Cl. 350-162.200.
Kato, Naoki: *See*—
Kamamori, Hitoshi; Iwasa, Koji; Suginoya, Mitsuru; Sano, Yutaka; Terada, Yumiko; and Kato, Naoki, 4,999,094, Cl. 204-180.200.
Kato, Yasuyuki; Matsuda, Masaaki; and Ochi, Kenji, to Sumitomo Chemical Co. Ltd. Process for recovery of gallium by chelate resin. 4,999,171, Cl. 423-112.000.
Kato, Yoshitake, to Hitachi Maxell Ltd. Disc cartridge with alignment elements on two hub halves. 4,999,727, Cl. 360-133.000.
Katoh, Hiromasa: *See*—
Usami, Mitsuo; Shiozawa, Noboru; Yamada, Toshio; Katoh, Hiromasa; Satoh, Kazuyoshi; Kobayashi, Tohru; Kimura, Tatsuya; Hamamoto, Masato; Shimizu, Atsushi; and Koyu, Kaoru, 4,999,520, Cl. 307-456.000.
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Katou, Masayuki, to Sumitomo Rubber Industries, Ltd. Casting tire including continuous circumferential sidewall indentations. 4,998,980, Cl. 152-324.000.
Katsuno, Akira, to Fujitsu Limited. Floating point operation unit in division and square root operations. 4,999,801, Cl. 364-748.000.
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Katz, Beatriz E., to Alternative Energy Research Center Inc. Control electromagnet. 4,999,559, Cl. 318-696.000.
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Kaustrater, Gert: *See*—
Schiele, August; and Kaustrater, Gert, 4,998,458, Cl. 89-46.000.
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Garner, Harold E.; Miller, Merrill M.; Kavanagh, Brian E.; and Spring, Gorden W., 4,998,902, Cl. 446-2.000.
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Kawahara, Takayuki: *See*—
Kitsukawa, Goro; Yanagisawa, Kazumasa; Kawahara, Takayuki; Hori, Ryoichi; Nakagome, Yoshinobu; Hamma, Noriyuki; Itoh, Kiyoo; and Tukada, Hiromi, 4,999,519, Cl. 307-446.000.
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Hiraoka, Takeshi; Takeguchi, Shunsuke; and Kawai, Satoshi, 4,998,955, Cl. 74-567.000.
Kawamata, Seizi, to Nihon Seikan Kabushiki Kaisha. Can and method of manufacturing the same. 4,998,638, Cl. 220-626.000.
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Kawamura, Hideo, to Isuzu Motors. Heat insulating engine. 4,998,517, Cl. 123-270.000.
Kawamura, Hideo, to Isuzu Ceramics Research Institute Co., Ltd. Turbocharger control system. 4,998,951, Cl. 60-608.000.
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Kawamura, Tomoyoshi: *See*—
Matsumoto, Shigeyuki; and Kawamura, Tomoyoshi, 4,998,754, Cl. 285-150.000.
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Yamaguchi, Yoshinori, 4,998,966, Cl. 114-270.000.
Kawashima, Shigeru; Ide, Hiroshi; Kato, Kazuaki; Magara, Mitsuo; and Ishii, Yoshibumi, to Towa Chemical Industry Co., Ltd. Lactitol trihydrate crystal, crystalline mixture solid containing it and process for preparing them. 4,999,058, Cl. 127-29.000.
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Honda, Kazuyoshi; Sugita, Ryuji; Tohma, Kiyokazu; Kawawake, Yasuihiro; and Murakami, Yoshiki, 4,999,220, Cl. 427-132.000.
Kay, D. Alan R.: *See*—
Wilson, William G.; and Kay, D. Alan R., 4,999,174, Cl. 423-241.000.
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Fukuda, Kenji; and Kazama, Yasuo, 4,998,353, Cl. 30-392.000.
Kazarinov, Rudolf F.: *See*—
Henry, Charles H.; Kazarinov, Rudolf F.; and Shani, Yosi, 4,998,793, Cl. 350-96.150.
Kazor Systems Inc.: *See*—
Bezek, Donald J., 4,998,365, Cl. 40-545.000.
KCR Engine Automotive Parts, Inc.: *See*—
Carvalho, Americo, 4,998,515, Cl. 123-195.00C.
Keech, Eugene E. Metastable-proof flip-flop. 4,999,528, Cl. 307-279.000.
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Kobayashi, Mitsuru; and Keishirou, Hori, 4,998,577, Cl. 160-202.000.
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Distefano, Joseph; Haas, Roger; Nestle, Mark; and Kelley, Fred D., 4,998,658, Cl. 226-95.000.
Kelley, Gordon A., Jr.: *See*—
Barth, John E., Jr.; Drake, Charles E.; Hovis, William P.; Kalter, Howard L.; Kelley, Gordon A., Jr.; Lewis, Scott C.; Nickel, Daniel J.; and Yankosky, James A., 4,999,815, Cl. 365-230.060.
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Lueth, Gero; Becker, Rolf; Horn, Robert K.; Kempe, Uwe; and Vodrazka, Wolfgang, 4,999,029, Cl. 48-197.00R.
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Kenderi, Tibor; and Kenderi, Laszlo , 4,998,993, Cl. 239-295.000.
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Beach, Wayne H.; and Shick, Steven D., 4,998,574, Cl. 144-241.000.
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Ehrler, Horst, 4,999,570, Cl. 324-96.000.
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Kester, Jeffrey A.; Moos, Walter H.; and Thomas, Anthony J., to Warner-Lambert Company. Derivatives of 1,2,3,4-tetrahydro-9-acrisinamine. 4,999,430, Cl. 546-105.000.
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Kim, Dae-il; and Hwang, Woo-hyun, to Samsung Electron Devices Ltd. Plasma display panel. 4,999,541, Cl. 313-584.000.
Kim, Insop. Exercise device. 4,998,720, Cl. 272-96.000.
Kim, Ki-Joon, to SamSung Electronics Co., Ltd. Method of making an LED array. 4,999,310, Cl. 437-51.000.

Kimura, Okitoshi: *See*—
Kabata, Toshiyuki; Ohsawa, Toshiyuki; Yoneyama, Sachiko; and Kimura, Okitoshi, 4,999,263, Cl. 429-131.000.
Kimura, Shinichi, to Canon Kabushiki Kaisha. Electronic equipment for creating and displaying a document representative of another document. 4,999,788, Cl. 364-518.000.
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Usami, Mitsuo; Shiozawa, Noboru; Yamada, Toshio; Katoh, Hiromasa; Satoh, Kazuyoshi; Kobayashi, Tohru; Kimura, Tatsuya; Hamamoto, Masato; Shimizu, Atsushi; and Koyu, Kaoru, 4,999,520, Cl. 307-456.000.
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Hublikar, Sudhendra V.; and Kinaitis, Leonard G., 4,998,825, Cl. 374-50.000.
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Kinghorn, John R., to U.S. Philips Corporation. Teletext decoders with inhibit means for precluding over-writing codes in page memory. 4,999,706, Cl. 358-147.000.
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Kirchhoff, Robert A., to Dow Chemical Company, The. Novel poly(arylcyclobutenes). 4,999,449, Cl. 560-8.000.
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Inada, Shuji; Ohba, Toshihiro; Kishishita, Hiroshi; and Uede, Hisashi, 4,999,618, Cl. 340-781.000.
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Kit, Malon; and Kit, Saul, to NovaGene, Inc.; and Baylor College of Medicine. Thymidine kinase negative insertion mutants of pseudorabies virus and methods for the production of same. 4,999,296, Cl. 435-235.100.
Kit, Saul: *See*—
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Maruyama, Shigeru; Fueki, Shunsuke; Kitajima, Hironobu; and Kiuchi, Takashi, 4,999,487, Cl. 250-216.000.
Kitamura, Keiichi: *See*—
Sato, Hideaki; Nagashima, Hisao; Fujiwara, Kenichi; and Kitamura, Keiichi, 4,998,413, Cl. 62-149.000.
Kitayama, Yuyaka: *See*—
Nakase, Noriaki; Hokkedo, Mamoru; Yamamoto, Etsuji; Yoshida, Masahiko; and Kitayama, Yuyaka, 4,999,089, Cl. 196-110.000.
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Kiyomura, Akio; Terashima, Takayoshi; and Suzuki, Tohru, to Sanken Electric Co., Ltd. Avalanche breakdown semiconductor device. 4,999,683, Cl. 357-13.000.
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Bertleff, Werner; Koeffer, Dieter; Klaeui, Wolfgang; and Song, Choong-Eui, 4,999,443, Cl. 556-136.000.
Klaus, Franz, to Franz Klaus Union Armaturen Pumpen GmbH & Co. Magnetic pump drive. 4,998,863, Cl. 417-63.000.
Klebe, Gerhard: *See*—
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,999,044, Cl. 71-92.000.
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Klee, Mareike K.; and Brand, Hans-Wolfgang, to U.S. Philips Corporation. Method of manufacturing titanium dioxide powder. 4,999,181, Cl. 423-608.000.
Klein, Julian L., to Ryko Manufacturing Company. Vehicle washer communication system. 4,998,547, Cl. 134-57.00R.
Kleinschmit, Peter: *See*—
Panster, Peter; Grethe, Horst; and Kleinschmit, Peter, 4,999,413, Cl. 528-30.000.
Klemm, Gerhard. Screen printing machine having an inclined screen. 4,998,470, Cl. 101-115.000.
Klessig, Clarence E.: *See*—
Gaffney, Thomas E.; Klessig, Clarence E.; Weir, Alan J.; and Grycan, Stanley M., 4,998,321, Cl. 16-110.00R.
Klimke, Peter; and Neubert, Paul, to Resopal GmbH. Built-in sink. 4,998,306, Cl. 4-619.000.
Klinedinst, Keith A.; and Gary, Richard A., to GTE Laboratories Incorporated. Method for coating phosphor particles using aluminum isopropoxide precursors and an isothermal fluidized bed. 4,999,219, Cl. 427-69.000.
Knaepen, Marc, to Exxon Chemical Patents, Inc. Process for producing weather resistant construction elements. 4,999,064, Cl. 156-62.200.
Kneib, Rudi: *See*—
Feichtiger, Dieter; Holzhauer, Horst; Kneib, Rudi; Polic, Marko; and Weikert, Gunther, 4,998,447, Cl. 74-502.600.
Knierim, David L.; and Brown, Gary L., to Tektronix, Inc. Method and apparatus for processing component signals to preserve high frequency intensity information. 4,999,702, Cl. 358-32.000.
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Fatigati, Charles, 4,998,418, Cl. 66-14.000.
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Vos, Thomas H.; Kumkoski, James M.; Knowlden, Leo S.; and Goetz, George W., 4,999,063, Cl. 149-109.600.
Koai, Kwang T., to GTE Laboratories Incorporated. Integrated optical switches with very high extinction ratios. 4,998,791, Cl. 350-96.140.
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Morishima, Yoichi; Kobayashi, Kazuo; and Suzuki, Isao, 4,999,560, Cl. 318-779.000.
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Sato, Masayuki; Kobayashi, Noriyuki; Funamoto, Akihiko; and Kataoka, Yoshitoshi, 4,999,442, Cl. 556-14.000.
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Usami, Mitsuo; Shiozawa, Noboru; Yamada, Toshio; Katoh, Hiromasa; Satoh, Kazuyoshi; Kobayashi, Tohru; Kimura, Tatsuya; Hamamoto, Masato; Shimizu, Atsushi; and Koyu, Kaoru, 4,999,520, Cl. 307-456.000.
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Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,999,044, Cl. 71-92.000.
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Koch, Paul; and Belz, Klaus, to Faudi Feinbau GmbH. Filter element which conducts static electricity. 4,999,108, Cl. 210-243.000.
Koch, Rudolf, to Siemens Aktiengesellschaft. Integratable amplitude-regulated oscillator circuit. 4,999,588, Cl. 331-109.000.
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Brazdrum, Helmut; and Koch, Rudolf, 4,999,634, Cl. 341-172.000.
Koda, Yoshiharu; and Takashima, Tadashi, to Kabushiki Kaisha Denkosha. Starting device for discharge tube. 4,999,546, Cl. 315-225.000.
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Kogan, Patricia W.; Rudnic, Edward M.; Sequeira, Joel A.; and Chaudry, Imtiaz A., to Schering Corporation. Sustained release oral suspensions. 4,999,189, Cl. 424-79.000.

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Kongo, Takeshi: *See*—
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Konica Corporation: *See*—
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Konishi, Hikaru: *See*—
Ikada, Yoshito; Konishi, Hikaru; Corretge, Eugene; and Imamura, Kazuo, 4,999,110, Cl. 210-490.000.

Kononov, Viktor V.: *See*—
Evstratov, Jury I.; Kononov, Viktor V.; Sandigursky, Oleg L.; Nerovny, Mikhail T.; Larionov, Sergei V.; and Evstratov, Oleg I., 4,998,846, Cl. 405-78.000.

Korber AG: *See*—
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Freeman, Glenn E.; Valimont, James L.; Dunaway, James H.; and Korenkiewicz, Karen J., 4,998,784, Cl. 350-3.700.

Korn, Darryl K.: *See*—
Ralph, John T.; Beckley, Guy B.; Brady, Frank T.; Jelenek, Ivan; Korn, Darryl K.; Meyer, John; Nay, Daniel L.; Searle, Colin M.; Shick, David; Williams, Richard W.; and Wilson, Jon C., deceased, 4,999,771, Cl. 364-200.000.

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Funakubo, Tomoki; Hakamatsuka, Yasuharu; Aihara, Mamoru; Watanabe, Kazuhiro; Koshiishi, Kiyozou; and Shigetomi, Sadao, 4,998,872, Cl. 425-143.000.

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Buckholz, Lawrence, Jr.; Farbood, Mohamad I.; Kossiakoff, Nicolas; and Scharpf, Lewis G., 4,999,207, Cl. 426-536.000.

Kostos, Jeffery; Kaspar, Melvin; and Artwohl, Paul, to Ardco, Inc. Insulated refrigerator door assembly with substantially all glass front doors. 4,998,382, Cl. 49-501.000.

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Koudsi, Antoine J.: *See*—
Al-Sioufi, Habib; and Koudsi, Antoine J., 4,998,925, Cl. 604-283.000.

Kovach, John R. Potato peeling device. 4,998,467, Cl. 99-632.000.

Kowal, Wieslaw M.: *See*—
Skinner, Geoffrey F.; and Kowal, Wieslaw M., 4,999,030, Cl. 48-197.00R.

Kowalczyk, David; Dow, Ian J.; and May, Carl D., to General Motors Corporation. Low effort remote latch actuator. 4,998,758, Cl. 292-201.000.

Koyo Seiko Co., Ltd.: *See*—
Yoshida, Teruo; and Ueno, Hiroshi, 4,999,394, Cl. 524-514.000.

Koyu, Kaoru: *See*—
Usami, Mitsuo; Shiozawa, Noboru; Yamada, Toshio; Katoh, Hiromasa; Satoh, Kazuyoshi; Kobayashi, Tohru; Kimura, Tatsuya; Hamamoto, Masato; Shimizu, Atsushi; and Koyu, Kaoru, 4,999,520, Cl. 307-456.000.

Kozaki, Masami: *See*—
Chida, Shohei; Kozaki, Masami; Asahi, Toshinori; Ono, Chiyoaki; Iwasa, Seiji; Fukunaga, Taizou; and Takemura, Moriyuki, 4,998,776, Cl. 299-59.000.

Kozuki, Susumu; Ushiro, Tatsuzo; Masui, Toshiyuki; Takei, Masahiro; and Nagasawa, Kenichi, to Canon Kabushiki Kaisha. Multi-channel information signal reproducing apparatus for reproducing information signals from a tape-shaped record bearing medium having a plurality of areas which respectively extend longitudinally and parallel with each other. 4,999,722, Cl. 360-77.150.

Kraatz, Udo: *See*—
Holmwood, Graham; Kraatz, Udo; Buchel, Karl H.; Brandes, Wilhelm; Dutzmann, Stefan; and Reinecke, Paul, 4,999,440, Cl. 549-556.000.

Krajewski, John J.: *See*—
Gaske, Joseph; Krajewski, John J.; and Noren, Gerry K., 4,999,216, Cl. 427-44.000.

Kraus, Willibald, to TRW United Carr GmbH & Co. Plastic sealing cover. 4,998,642, Cl. 220-307.000.

Kraus, Willibald, to TRW United-Carr GmbH & Co. Plastic part for engagement with a threaded bolt. 4,999,019, Cl. 411-512.000.

Krause, Hans: *See*—
Anaissie, Elias J.; Samonis, Georgios; Krause, Hans; and Bodey, Gerald P., 4,999,199, Cl. 424-450.000.

Kremer, Russell E.; and Francomano, David M., to Akzo America Inc. Process for producing monocrystalline group II-IV or group III-V compounds and products thereof. 4,999,082, Cl. 156-605.000.

Krieger, Uwe, to Andreas Kufferath GmbH & Co.; and Andreas-Kufferath-Platz. Disk-type decker. 4,999,104, Cl. 210-196.000.

Krivenko, Valery G.: *See*—
Kuchuk-Yatsenko, Sergei I.; Krivenko, Valery G.; Kuznetsov, Petr V.; Bogatyrev, Vladimir J.; Golovchenko, Sergei I.; and Ignatenko, Vadim J., 4,999,476, Cl. 219-97.000.

Krutak, James J.; Weaver, Max A.; Coates, Clarence A., Jr.; Hilbert, Samuel D.; Pruett, Wayne P.; and Parham, William W., to Eastman Kodak Company. Polyesters colored with the residue of heat stable anthraquinone compounds. 4,999,418, Cl. 528-272.000.

Kubacki, Lawrence G., to Process Systems Inc. Heat exchange device for food. 4,998,464, Cl. 99-455.000.

Kubo, Kazuhiro: *See*—
Oshima, Etsuo; Obase, Hiroyuki; Karasawa, Akira; Kubo, Kazuhiro; Miki, Ichiro; and Ishii, Akio, 4,999,363, Cl. 514-332.000.

Kubodera, Kenichi: *See*—
Kurihara, Takashi; Matsumoto, Shiro; Kainou, Toshikuni; Kanbara, Hirohisa; and Kubodera, Kenichi, 4,999,139, Cl. 252-587.000.

Kubota, Yasuhiko: *See*—
Matsui, Isamu; Uehara, Masao; Sakai, Shoji; Noda, Koshi; and Kubota, Yasuhiko, 4,998,407, Cl. 57-328.000.

Kubota, Yoichi: *See*—
Ishizuka, Koh; Nishimura, Tetsuharu; Ishii, Satoshi; Kubota, Yoichi; and Tsukiji, Masaaki, 4,998,798, Cl. 350-115.000.

Kuchuk-Yatsenko, Sergei I.; Krivenko, Valery G.; Kuznetsov, Petr V.; Bogatyrev, Vladimir J.; Golovchenko, Sergei I.; and Ignatenko, Vadim J., to Institut Elektrosvarki Imeni E. O. Patona Akademii Nauk USSR. Machine for pressure welding workpieces heated with arc moving in magnetic field. 4,999,476, Cl. 219-97.000.

Kuehn, Willi, to Robert Bosch GmbH. Current converter comprising current responsive, self oscillating, switching regulator. 4,999,566, Cl. 323-222.000.

Kugler, Andrew J.; and Wawro, Thaddeus J., to Welch Allyn, Inc. Ophthalmoscope with linear polarizer. 4,998,818, Cl. 351-205.000.

Kuhlman, Marvin G.; Sorensen, Gerald R.; and Gradecki, Raymond J. Light switch plate cover. 4,999,465, Cl. 200-308.000.

Kuhn, Gunther: *See*—
Puchinger, Herwig; Gerken, Hero; and Kuhn, Gunther, 4,999,164, Cl. 422-100.000.

Kuhne, Helmut; Frassek, Karl-Heinz; Sonderhof, Dieter; Lanzrath, Gunther; Steinseifer, Fritz; and Beck, Heinz, to Akzo N.V. Metal carboxylate derivatives for use in synthetic materials, emulsions and suspensions. 4,999,400, Cl. 525-196.000.

Kuijpers, Franciscus L. J. M.: *See*—
Raaymakers, Wilhelmus P. M.; and Kuijpers, Franciscus L. J. M., 4,999,825, Cl. 369-44.260.

Kuka Wehrtechnik GmbH: *See—*
Schiele, August; and Kaustrater, Gert, 4,998,458, Cl. 89-46.000.

Kulpinski, Robert W.: *See—*
Gasper, John; Kulpinski, Robert W.; and Lubinsky, Anthony R., 4,999,505, Cl. 250-484.100.

Kumkoski, James M.: *See—*
Vos, Thomas H.; Kumkoski, James M.; Knowlden, Leo S.; and Goetz, George W., 4,999,063, Cl. 149-109.600.

Kunczynski, Alexander J.: *See—*
Kunczynski, Jan K., 4,998,482, Cl. 104-178.000.

Kunczynski, Jan K., to Kunczynski, Zygmunt A.; and Kunczynski, Alexander J. Aerial tramway and method for relieving induced torque. 4,998,482, Cl. 104-178.000.

Kunczynski, Zygmunt A.: *See—*
Kunczynski, Jan K., 4,998,482, Cl. 104-178.000.

Kunz, Anton, to Balzers Aktiengesellschaft. Electrical current lead-in device at a vacuum chamber. 4,999,458, Cl. 174-9.00R.

Kuracina, Thomas C.; and Ohnemus, Randall. Safety syringe cap minimizing needle-stick probability. 4,998,922, Cl. 604-192.000.

Kurahashi, Kazuyoshi: *See—*
Yamada, Takahiro; Kurahashi, Kazuyoshi; and Watanabe, Shyuji, 4,998,379, Cl. 49-138.000.

Kuramitsu, Yohichi: *See—*
Okuno, Yoshihiro; and Kuramitsu, Yohichi, 4,999,698, Cl. 357-45.000.

Kuraray Co., Ltd.: *See—*
Moritani, Tohei; Fukutome, Susumu; Motoishi, Yasuo; and Oda, Hidemasa, 4,999,229, Cl. 428-36.600.
Nishida, Yasuaki; Fujisawa, Katsuya; Fujita, Yoshihiro; Fujiwara, Masao; Yoshikawa, Shigeo; and Uetsuki, Masao, 4,998,800, Cl. 350-162.200.

Kurata, Yukio: *See—*
Tsuji, Shigeki; Kurata, Yukio; and Yokota, Taizo, 4,998,806, Cl. 350-413.000.

Kurihara, Takashi; Matsumoto, Shiro; Kainou, Toshikuni; Kanbara, Hirohisa; and Kubodera, Kenichi, to Nippon Telegraph and Telephone Corporation. Organic nonlinear optical material and nonlinear optical device. 4,999,139, Cl. 252-587.000.

Kurland, Jonathan J.: *See—*
Bunning, Donald L.; Etzkorn, William G.; Haydon, William M.; Harkreader, Gordon G.; Kurland, Jonathan J.; Liu, Wai C.; and Vera-Castaneda, Ernesto, 4,999,452, Cl. 560-208.000.

Kuroda, Akiteru: *See—*
Orino, Shoji; Tanaka, Hiroyosh; and Kuroda, Akiteru, 4,999,245, Cl. 428-374.000.

Kuroda, Hirokazu; Nakai, Masaaki; Katoh, Takehiro; Ohya, Tetsuro; Izumi, Shuji; and Okuno, Akira, to Minolta Camera Kabushiki Kaisha. Camera with display device. 4,999,665, Cl. 354-468.000.

Kuroo, Takeshi: *See—*
Asakura, Tetsuro; Demura, Makoto; and Kuroo, Takeshi, 4,999,295, Cl. 435-177.000.

Kusefoglu, Selim H.: *See—*
Mathias, Lon J.; and Kusefoglu, Selim H., 4,999,410, Cl. 526-318.300.

Kushner, Burton A.: *See—*
Rotolico, Anthony J.; Kushner, Burton A.; and Aly, Amr, 4,999,225, Cl. 427-423.000.

Kusumoto, Kanichi: *See—*
Ototani, Tohei; Degawa, Toru; Kusumoto, Kanichi; and Ebata, Makoto, 4,999,053, Cl. 75-564.000.

Kutowy, Oleh: *See—*
Guiver, Michael D.; and Kutowy, Oleh, 4,999,415, Cl. 528-171.000.

Kuwabara, Ken-ichi; Ishigaki, Kunio; and Inayama, Takayuki, to Fuji Photo Film Co., Ltd. Silver halide photographic materials. 4,999,276, Cl. 430-264.000.

Kuwabara, Satoru; Izaki, Takeshi; Sakakibara, Kenji; and Kobayashi, Masanari, to Brother Kogyo Kabushiki Kaisha. Image forming apparatus having drive control unit. 4,999,666, Cl. 355-27.000.

Kuznetsov, Petr V.: *See—*
Kuchuk-Yatsenko, Sergei I.; Krivenko, Valery G.; Kuznetsov, Petr V.; Bogatyrev, Vladimir J.; Golovchenko, Sergei I.; and Ignatenko, Vadim J., 4,999,476, Cl. 219-97.000.

Kyowa Hakko Kogyo Co., Ltd.: *See—*
Nakano, Hirofumi; Hara, Mitsunobu; Takahashi, Isami; Asano, Kozo; Iida, Takao; and Morimoto, Makoto, 4,999,196, Cl. 424-116.000.
Oshima, Etsuo; Obase, Hiroyuki; Karasawa, Akira; Kubo, Kazuhiro; Miki, Ichiro; and Ishii, Akio, 4,999,363, Cl. 514-332.000.

Kyuma, Kazuo: *See—*
Hara, Kunihiko; Kojima, Keisuke; and Kyuma, Kazuo, 4,999,688, Cl. 357-19.000.

Laackman, Jeffrey T.: *See—*
Bocchi, David E.; Laackman, Jeffrey T.; and Bach, Stanley M., Jr., 4,998,531, Cl. 128-419.00D.

LaBarre, Andre E. Motor vehicle parking installation, forming an automatic individual garage in an urban environment. 4,998,856, Cl. 414-240.000.

LaBelle, Jeanette M. Body-attachable, concealable pouch. 4,998,653, Cl. 224-151.000.

Labinal S.A.: *See—*
Moly, Jose , 4,998,889, Cl. 439-247.000.

Labinger, Richard; Macri, Timothy F.; Yoder, Paul R., Jr.; and Valovich, David J., to Taunton Technologies, Inc. Topography measuring apparatus. 4,998,819, Cl. 351-212.000.

Lacy, Jeffrey L., to Baylor College of Medicine. High speed multiwire photon camera. 4,999,501, Cl. 050-385.100.

Ladd, James E., Jr.; and Busch, Francis, Jr., to Laura Lupton Inc. Facial cosmetic liquid make up kit. 4,998,617, Cl. 206-219.000.

Lagerstrand, Dan E., to Aktiebolaget Electrolux. Self-cleaning filter for a dishwasher. 4,998,548, Cl. 134-111.000.

Lagoutte, Pierre, to LMT Radio Professionnelle. Method and device for asynchronous mode transmission putting microcells into use. 4,999,835, Cl. 370-94.100.

Lahne, Ulrich; Hildebrandt, Ulrich; and Braeutigam, Max, to Linde Aktiengesellschaft. Heat transfer equipment. 4,998,583, Cl. 165-163.000.

Lai, Kwok Y.: *See—*
Chin, Albert K.; Nobles, Anthony A.; and Lai, Kwok Y., 4,998,972, Cl. 128-6.000.

L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See—*
Schultz, Jean-Pierre; Soler, Jean; and Nicoud, Daniel, 4,999,474, Cl. 219-74.000.

Laitram Corporation, The: *See—*
Lapeyre, James M., 4,999,795, Cl. 364-709.160.

Lakes, Dale: *See—*
Mehta, Rajendra; Lakes, Dale; and Saluke, William, 4,999,334, Cl. 503-226.000.

Lalo, Jack: *See—*
Garrigue, Roger; and Lalo, Jack, 4,999,455, Cl. 564-59.000.

LaMaster, Peter V.: *See—*
Blahut, Donald E.; Colbry, Brian W.; Lovett, Thomas D.; and LaMaster, Peter V., 4,999,808, Cl. 364-900.000.

Lambert, Jack L.: *See—*
Fina, Louis R.; Lambert, Jack L.; and Bridges, Ronald L., 4,999,190, Cl. 424-79.000.

Lambert, Vincent, II. Door attachable safe. 4,998,424, Cl. 70-63.000.

Lamerie, N.V.: *See—*
Perovetz, Lawrence M.; and Bhattacharya, Nagendra N., 4,999,054, Cl. 106-1.230.

Lamle, Stewart M. Two-sided , aying piece game set. 4,998,737, Cl. 273-296.000.

Lamon, Mark S. Brine shrimp egg harvester. 4,998,369, Cl. 43-6.500.

Landa, Benzion; and Fenster, Paul, to Spectrum Sciences B.V. Imaging system with rigidizer. 4,999,677, Cl. 355-273.000.

Landis, William R.: *See—*
Anderson, Gregory W.; Landis, William R.; Patton, Paul B.; Schimbke, Paul A.; and Seidel, Michael J., 4,999,792, Cl. 364-550.000.

Landt, Jeremy A.; Koelle, Alfred R.; and Eckhardt, David A., to Amtech Technology Corporation. Range limiting system. 4,999,636, Cl. 342-90.000.

Lane, Jan M.; Corrigan, John; and Crouch, Philip D., to Howmet Corporation. Reinforced ceramic investment casting shell mold and method of making such mold. 4,998,581, Cl. 164-517.000.

Lane, Lawrence J.: *See—*
D'Antonio, Michael J.; Gibbs, Irving A.; Lane, Lawrence J.; and Lawson, Rodney A., 4,999,564, Cl. 322-99.000.

Lang, Hans-Jochen: *See—*
Englert, Heinrich C.; Lang, Hans-Jochen; Mania, Dieter; and Scholkens, Bernward, 4,999,371, Cl. 514-422.000.

Lang, Heinrich; and Selder, Harald, to Sulzer-Escher Wyss GmbH. Method for heat treating short fiber fractions after separation of the long fiber fractions from a secondary fiber mixture. 4,999,084, Cl. 162-4.000.

Lange, Hans-Willi, to Albert Schulte Sohne GmbH. & Co. Apparatus for movably supporting beds and the like. 4,998,320, Cl. 16-35.00R.

Lange, Howard G.: *See—*
Adler, Robert; Fendley, James R.; Lange, Howard G.; Prazak, Charles J., III; Steiner, Johann; and Strauss, Paul, 4,998,901, Cl. 445-3.000.

Langenhorst, Gunter. Inspection cover arrangement. 4,998,381, Cl. 49-463.000.

Lanxide Technology Company, LP: *See—*
Dwivedi, Ratnesh K.; and Irick, Virgil, Jr., 4,998,578, Cl. 164-6.000.

Lanzrath, Gunther: *See—*
Kuhne, Helmut; Frassek, Karl-Heinz; Sonderhof, Dieter; Lanzrath, Gunther; Steinseifer, Fritz; and Beck, Heinz, 4,999,400, Cl. 525-196.000.

Lapeyre, James M., to Laitram Corporation, The. Portable keyboard operated alpha computer system with few keys and visual keystroke instructions. 4,999,795, Cl. 364-709.160.

Lapre, Marcella A.; and Friederichs, Winand H. A. M., to U.S. Philips Corporation. Electric lamp including one-piece contact elements. 4,999,538, Cl. 313-318.000.

Larionov, Sergei V.: *See—*
Evstratov, Jury I.; Kononov, Viktor V.; Sandigursky, Oleg L.; Nerovny, Mikhail T.; Larionov, Sergei V.; and Evstratov, Oleg I., 4,998,846, Cl. 405-78.000.

Larocca, David J.: *See—*
Brunck, Terence K.; Larocca, David J.; and Monahan, John J., 4,999,421, Cl. 530-350.000.

Larsen, John A.: *See—*
Peterson, Robert S.; and Larsen, John A., 4,998,427, Cl. 72-9.000.

Larsen, John D. Body cooling apparatus. 4,998,415, Cl. 62-231.000.

Larson, Allen L.: *See—*
Chen, Hung-San; Farleigh, Scott E.; Helton, John S.; and Larson, Allen L., 4,999,832, Cl. 370-85.140.

Lasercard Company L.P.: *See—*
Wilfert, Ronald A., 4,999,065, Cl. 156-64.000.

Lathrop, Richard R., Jr.: *See—*
Bender, David K.; and Lathrop, Richard R., Jr., 4,999,731, Cl. 361-119.000.

Latourrette, Bertrand: *See—*
Gourlaouen, Claire; Magnier, Claude; Latourrette, Bertrand; Tugaye, Anne; and Deneuve, Francoise, 4,999,180, Cl. 423-592.000.

Lauks, Nikola. Device and method for producing implant cavities. 4,998,881, Cl. 433-173.000.

Laura Lupton Inc: *See—*
Ladd, James E., Jr.; and Busch, Francis, Jr., 4,998,617, Cl. 206-219.000.

Laurel Bank Machines Co., Ltd.: *See—*
Shigetoshi, Imai; and Matoba, Yasuhiko, 4,998,998, Cl. 271-263.000.

Laureyns, Rene. Random data lotto printer and method for its manufacture. 4,998,473, Cl. 101-333.000.

Lauritzen, Donald R.: *See—*
Paxton, Donald B.; Lauritzen, Donald R.; and Anderson, Scott R., 4,998,751, Cl. 280-741.000.

Lausier, Joan M.: *See—*
Barnett, Stanley M.; Lausier, Joan M.; and Montalto, Samuel J., 4,999,198, Cl. 424-449.000.

Lawassani, Abdi R.; and Wasik, Mark J., to United Technologies Automotive. Vehicle sun visor and method of making. 4,998,767, Cl. 296-97.100.

Lawler, Adrian; Schwark, Peter; and Moore, Joe. Artificial aquatic bait article and method of manufacture. 4,998,370, Cl. 43-42.060.

Lawn-Boy, Inc.: *See—*
Martin, Gregory D., 4,998,905, Cl. 474-42.000.

Lawson, Rodney A.: *See—*
D'Antonio, Michael J.; Gibbs, Irving A.; Lane, Lawrence J.; and Lawson, Rodney A., 4,999,564, Cl. 322-99.000.

Lazar, James G.: *See—*
Lockwood, Frances E.; Lazar, James G.; and Comer, Clarence-M., 4,999,122, Cl. 252-32.500.

Le, Hanh T., to Conoco. Mineral oil or synthetic oil compositions containing terpolymers of alkyl acrylates or methacrylates, olefinically unsaturated homo or heterocyclic-nitrogen compound and allyl acrylates or methacrylates or perfluoroalkyl ethyl acrylates or methacrylates. 4,999,123, Cl. 252-51.50R.

Lease, Michael E.: *See—*
Martin, Eugene; Martin, Harold; and Lease, Michael E., 4,998,323, Cl. 452-125.000.

Lechner, Ulrike: *See—*
Deschler, Ulrich; Lechner, Ulrike; and Witzel, Michael, 4,999,249, Cl. 428-447.000.

Leclere, Jean: *See—*
Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; and Leclere, Jean, 4,998,322, Cl. 452-71.000.

Le Devehat, Eugene, to FMC Corporation. Fluid loading arm emergency disconnection system. 4,998,560, Cl. 137-616.000.

Ledoux, Patrick R., to Pipe Liners, Inc. Apparatus for deforming plastic tubing for lining pipe. 4,998,871, Cl. 425-140.000.

Lee, Arthur K.: *See—*
Sanchez-Caldera, Luis E.; Lee, Arthur K.; Suh, Nam P.; and Chun, Jung-Hoon, 4,999,050, Cl. 75-244.000.

Lee, Chi-Chang: *See—*
Jones, David C.; and Lee, Chi-Chang, 4,999,222, Cl. 427-250.000.

Lee, Hee K., to Brother International Corporation. Portable ironing press including chain, gear, and spring arrangement, for pressing articles. 4,998,360, Cl. 38-36.000.

Lee, Hsuan-Yu. Desk lamp with adjustable lights. 4,999,756, Cl. 362-250.000.

Lee, Kyou Sang, to Heubg-Ah Tire & Rubber Co., Ltd. Golf ball. 4,998,733, Cl. 273-232.000.

Lee, Ming-Sheng, to Board of Regents, The University of Texas System, The. Detection of genomic abnormalities with unique aberrant gene transcripts. 4,999,290, Cl. 435-6.000.

Lee, William C., to ITT Corporation. Network connectivity control by artificial intelligence. 4,999,833, Cl. 370-94.100.

Lehmann, Hand D.: *See—*
Schmied, Bernhard; Lehmann, Hand D.; Baldinger, Verena; and Ruebsamen, Klaus, 4,999,345, Cl. 514-117.000.

Lehmann, Urs; and Hoegerle, Karl, to Ciba-Geigy Corporation. Process for trichromatic dyeing or printing. 4,999,027, Cl. 8-543.000.

Lehnert, Michael: *See—*
Rodi, Anton; Hauck, Dieter; Lehnert, Michael; and Jurkewitz, Manfred, 4,998,472, Cl. 101-216.000.

Lehr, Lothar: *See—*
Reuter, Wolfgang; Debus, Jurgen; and Lehr, Lothar, 4,998,702, Cl. 248-278.000.

Lehto, Ari: *See—*
Jappinen, Kalervo A.; Hakala, Marja-Riitta; Jalava, Jouko S.; and Lehto, Ari, 4,998,431, Cl. 73-1.00G.

Leibowitz, Joel. Compound grip for handguns. 4,998,367, Cl. 42-71.020.

Leica GmbH: *See—*
Farnung, H. Peter; Hengst, Alfred; and Keiner, Heinz, 4,998,357, Cl. 350-556.000.

Leichliter, Ronald P.: *See—*
Moody, Lawrence G.; Childress, Thomas E.; Pitrolo, Robert L.; Ritscher, James S.; and Leichliter, Ronald P., 4,999,446, Cl. 556-470.000.

Leifheit, David H., to Drackett Company, The. Multiple compartment flexible package. 4,998,671, Cl. 239-44.000.

Leinert, Herbert: *See—*
Tsaklakidis, Christos; Leinert, Herbert; and Freund, Peter, 4,999,361, Cl. 514-333.000.

Leitz, Edgar; Bottenbruch, Ludwig; Ott, Karl-Heinz; Jung, Alfred; and Grigo, Ulrich, to Bayer Aktiengesellschaft. Polymerization of cyclic aromatic oligomers with low temperature aprotic organic solvent. 4,999,420, Cl. 528-371.000.

Leland Stanford Junior University, The Board of Trustees of the: *See—*
Meyer, Craig H.; and Pauly, John M., 4,999,580, Cl. 324-309.000.

Lengerich, Bernhard V.; Haynes, Lynn C.; Levine, Harry; Otterburn, Michael S.; Mathewson, Paul; and Finley, John, to Nabisco Brands, Inc. Extrusion baking of cookies having liposome encapsulated ingredients. 4,999,208, Cl. 426-549.000.

Lennon, Donald J.; and Murphy, Timothy C., Jr., to Hygeia Sciences, Inc. Disposable, pre-packaged device for conducting immunoassay procedures. 4,999,163, Cl. 422-58.000.

Leo, Robert P.; McColgan, Mark W.; Stockman, James E., III; and Young, Jeffrey H., to International Business Machines Corporation. Communication method and apparatus. 4,999,834, Cl. 370-94.100.

Leonard, Judson S.: *See—*
Turrini, Silvio; Leonard, Judson S.; and Jouppi, Norman P., 4,999,803, Cl. 364-748.000.

Lepicard, Alain: *See—*
Denis, Jean F.; Lepicard, Alain; and Ropars, Henri, 4,998,480, Cl. 102-393.000.

Leuer, Thomas J. Methods and apparatus for taking portraits. 4,999,657, Cl. 354-220.000.

Leung, Han C.: *See—*
Park, Joon; Taketani, Stanley; Leung, Han C.; and Pelzman, George, 4,998,712, Cl. 269-25.000.

LeVan, Martin D., to Du Pont de Nemours, E. I., and Company. Making new stretchable batts. 4,999,232, Cl. 428-113.000.

Levine, Harry: *See—*
Lengerich, Bernhard V.; Haynes, Lynn C.; Levine, Harry; Otterburn, Michael S.; Mathewson, Paul; and Finley, John, 4,999,208, Cl. 426-549.000.

Levinson, Lionel M., to General Electric Company. Electrical-energy-supplying device having an extended storage life. 4,999,576, Cl. 324-142.000.

Lewis, Charles W.: *See—*
Hull, Charles W.; and Lewis, Charles W., 4,999,143, Cl. 264-22.000.

Lewis, Ivor A. S.: *See—*
Allen, Mark; and Lewis, Ivor A. S., 4,999,493, Cl. 250-288.000.

Lewis, Scott C.: *See—*
Barth, John E., Jr.; Drake, Charles E.; Hovis, William P.; Kalter, Howard L.; Kelley, Gordon A., Jr.; Lewis, Scott C.; Nickel, Daniel J.; and Yankosky, James A., 4,999,815, Cl. 365-230.060.

Lex Systems Southeast: *See—*
Rice, Owen, Jr.; and Joblonicky, Bruce A., 4,999,672, Cl. 355-202.000.

L'hermite, Pierre, to U.S. Philips Corp. Photomultiplier tube comprising a large first dynode and a stackable-dynode multiplier. 4,999,540, Cl. 313-533.000.

Lieb, M. Jeremy: *See—*
Bowers, William W.; Lieb, M. Jeremy; and Shockey, Robert J., 4,998,969, Cl. 123-187.50R.

Liedek, Egon; and Haegele, Gerhard, to BASF Aktiengesellschaft. Zinc salts, lead salts and/or calcium salts of carboxylic acids and their use as corrosion inhibitors. 4,999,134, Cl. 252-389.510.

Liggett, Michael D.: *See—*
Meyer, Karen M.; Liggett, Michael D.; Conklin, Robert J.; and Barker, Charles J., 4,998,707, Cl. 251-129.150.

Lilly, A. Clifton, Jr.: *See—*
Kallianos, Andrew G.; Lilly, A. Clifton, Jr.; Whidby, Jerry F.; and Dwyer, Rowland W., Jr., 4,998,542, Cl. 131-365.000.

Limburg, John M.: *See—*
Thacker, Milton B.; Limburg, John M.; and Memmott, Vincent J., 4,999,100, Cl. 208-155.000.

Lin, Cheng Chen: *See—*
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Weber, Gunter, 4,999,113, Cl. 210-664.000.

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Lunn, Anthony C.; and Mattei, Frank V., to Ethicon, Inc. Conformable, stretchable surgical wound closure tape. 4,999,235, Cl. 428-156.000.
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Vink, Timothy; Burkholder, Robert F.; D'Aleo, Michael J.; Elsbury, Andrew; Flowers, Woodie; Lordo, Richard; and McCall, Shawn R., 4,998,635, Cl. 220-3.400.
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Magoolaghan, Jack. Universal method and apparatus for testing clutches and bands within an automatic transmission. 4,998,437, Cl. 73-118.100.
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Babel, Werner; and Schwarz, Walter, 4,998,852, Cl. 409-144.000.
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Malleolo, Patrick F. Ultrasonic pest repeller. 4,999,818, Cl. 367-139.000.
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Malone, Stephen W. Paper tape winding and inverting device. 4,998,682, Cl. 242-67.10R.
Maltarp, Kim F. Circular ring shaped brush section for sweeping machine. 4,998,316, Cl. 15-181.000.

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Mantlik, Konrad, to Grote & Hartmann GmbH & Co. KG. Plastic casing provided with coding elements for machine processing. 4,998,893, Cl. 439-488.000.
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Marion Laboratories: *See*—
Casillan, Angel, 4,999,200, Cl. 424-480.000.
Markus, Robert. Collapsible bed-pan support for invalids. 4,998,301, Cl. 4-457.000.
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Marovskis, Harijs B., to Tetra Pak Holdings & Finance S.A. Shipping container for packing units. 4,998,637, Cl. 220-6.000.
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Martin, Gerard: *See*—
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Martin, Gregory D., to Lawn-Boy, Inc. Multiple speed pulley assembly. 4,998,905, Cl. 474-42.000.
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Martin, Jerry L. Digital air pressure gauge and inflation device. 4,998,438, Cl. 73-146.800.
Martin, Lawrence L.; Payack, Joseph F.; and Ong, Helen H., to Hoechst-Roussel Pharmaceuticals Inc. (1,2,3,4-tetrahydro-9-acridinimino)cyclohexane carboxylic acid and related compounds. 4,999,358, Cl. 514-297.000.
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Martin Marietta Energy Systems, Inc.: *See*—
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Martinson, Jon P. Glue gun holder apparatus. 4,998,698, Cl. 248-176.000.
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Marx, Edmund N., Jr. Dispersion roll in a fourdrinier machine. 4,999,086, Cl. 162-209.000.
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Sadoway, Donald R., 4,999,097, Cl. 204-243.00R.
Wurtman, Richard J.; Wurtman, Judith J.; and Spring, Bonnie, 4,999,382, Cl. 514-646.000.
Massarelli, Liberto; and Sampaolesi, Roberto, to Societa Italiana Vitro-SIV-S.p.A. Device for mounting insulating double-glazing onto a fixed frame. 4,998,392, Cl. 52-208.000.
Masson, Thierry, to Thomson Composants Militaires et Spatiaux. Fast analog-digital converter with parallel structure. 4,999,630, Cl. 341-120.000.
Masters, Stephen C., to Scott Motors, Inc. Pulse width modulator motor control. 4,999,556, Cl. 318-599.000.
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Mathews, Clifford D. Tree shaker force regenerator. 4,998,402, Cl. 56-340.100.
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Matsumoto, Fukuji; Tawara, Yoshio; and Hayashi, Michio, to Shin-Etsu Chemical Co., Ltd. Silicon carbide diffusion tube for semi-conductor. 4,999,228, Cl. 428-34.400.
Matsumoto, Nobuo: *See*—
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Matsunaga, Kuniyoshi: *See*—
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Honda, Kazuyoshi; Sugita, Ryuji; Tohma, Kiyokazu; Kawawake, Yasuihiro; and Murakami, Yoshiki, 4,999,220, Cl. 427-132.000.
Ishiko, Daisuke; Toda, Kazurou; Kamada, Osamu; and Miura, Akihiro, 4,999,571, Cl. 324-96.000.
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Cancelosa, Tammy J.; and Matthews, Tammy J., 4,998,838, Cl. 401-202.000.
Matti, Kahonen. Body construction of a wind instrument and procedure for producing a wind instrument with said construction. 4,998,456, Cl. 84-384.000.
Mattson, David R.; Covey, Joel; and Weibel, Stephen, to Mattson Instruments, Inc. Dual beam optical nulling interferometric spectrometer. 4,999,010, Cl. 356-346.000.
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Mattson, David R.; Covey, Joel; and Weibel, Stephen, 4,999,010, Cl. 356-346.000.
Matusiak, Zbigniew S.: *See*—
Boyle, Francis T.; and Matusiak, Zbigniew S., 4,999,364, Cl. 514-340.000.
Matzner, Bruce: *See*—
Johansson, Eric B.; Elkins, Robert B.; Crowther, Russell L.; and Matzner, Bruce, 4,999,153, Cl. 376-443.000.
Mavadia, Bhaskar; and Scarlett, Jeremy A., to Econocruise Limited. Electromagnetic actuators. 4,999,531, Cl. 310-23.000.
Mawer, Eric L.; Vanderminnen, Martin; Willans, Robert D. H.; Graham, Michael; and Manwell, Robert E., to Cominco Ltd. Electrode casting system. 4,998,579, Cl. 164-130.000.
Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V.: *See*—
Staab, Heinz A.; and Elbl, Karin, 4,999,441, Cl. 552-291.000.
Maxim Integrated Products: *See*—
Bingham, David; and Allen, Charles M., 4,999,761, Cl. 363-60.000.
Maxtor Corporation: *See*—
Wilson, Rosser S.; and Seuberling, Frank, 4,999,720, Cl. 360-48.000.
May, Carl D.: *See*—
Kowalczyk, David; Dow, Ian J.; and May, Carl D., 4,998,758, Cl. 292-201.000.
Maynard, Arthur W. Multi-purpose portable workbench cart. 4,998,742, Cl. 280-35.000.
Mazda Motor Corporation: *See*—
Baba, Fumiaki; and Oda, Jyujiro, 4,998,449, Cl. 74-844.000.
Kashiwagi, Akihiro; and Kijima, Takao, 4,998,748, Cl. 280-690.000.
McAllister, Jeffrey S.; and Johnson, Steven M., to Hewlett-Packard Company. Disk drive having an electrically isolated disk stack. 4,999,724, Cl. 360-98.080.
McAuliffe, Lawrence, Jr., to Coltec Industries Inc. Solenoid operated pressure control valve. 4,998,559, Cl. 137-596.170.
McCall, Samuel L., Jr.: *See*—
Huang, Kai-Feng; Jewell, Jack L.; McCall, Samuel L., Jr.; and Tai, Kuochou, 4,999,842, Cl. 372-45.000.
McCall, Shawn R.: *See*—
Vink, Timothy; Burkholder, Robert F.; D'Aleo, Michael J.; Elsbury, Andrew; Flowers, Woodie; Lordo, Richard; and McCall, Shawn R., 4,998,635, Cl. 220-3.400.
McCallum, Robert S., to Delphax Systems. Venetian blinding. 4,999,653, Cl. 346-159.000.
McCaslin, Lynn M.: *See*—
Jackson, John E.; McCaslin, Lynn M.; Stavros, Anthony J.; and Tucker, Robert C., Jr., 4,999,255, Cl. 428-552.000.
McCaslin, Shawn R.; and van Bavel, Nicholas R., to Motorola, Inc. Transient free interpolating decimator. 4,999,798, Cl. 364-724.100.
McClanahan, Robert F.: *See*—
Washburn, Robert D.; McClanahan, Robert F.; and Wedeen, Robert S., 4,999,583, Cl. 330-86.000.
McClendon, Evelyn. Premoistened prepackaged disposable disinfectant wiper. 4,998,984, Cl. 206-205.000.
McColgan, Mark W.: *See*—
Leo, Robert P.; McColgan, Mark W.; Stockman, James E., III; and Young, Jeffrey H., 4,999,834, Cl. 370-94.100.
McCormick, Peter E.; and Autry, Walter D., Jr., to EOA Systems, Inc. Programmable breakaway clutch system with collapsible failure mode. 4,998,606, Cl. 192-56.00F.
McCullough, Francis P., Jr.; and Matoy, Robert L., to Dow Chemical Company, The. Fire resistant surfaces for hot air balloons. 4,999,236, Cl. 428-233.000.
McCullough, Francis P., Jr.; Hall, David M.; Stobby, William G.; and Suh, Kyung W., to Dow Chemical Company, The. Carbonaceous foams. 4,999,385, Cl. 521-149.000.
McDade, George L.: *See*—
Claxton, Philander P., III; McDade, George L.; and Schaffer, Jon D., 4,998,534, Cl. 128-670.000.
McDaniel, Louis: *See*—
Coduti, Phillip L.; and McDaniel, Louis, 4,999,241, Cl. 428-340.000.
McElhaney, William L.; Floyd, Roger M.; and Duncan, Farris N., to Georgia-Pacific Corporation. Multi-cell container. 4,998,667, Cl. 229-120.370.
McGraw, Montgomery: *See*—
Culley, Paul R.; and McGraw, Montgomery, 4,999,805, Cl. 364-900.000.
McKaig, Phyllis J. Bed side rail holding bracket. 4,998,700, Cl. 248-214.000.
McKim, Matthew P.: *See*—
Kahler, Brett D.; and McKim, Matthew P., 4,999,302, Cl. 435-266.000.
McLaurin, Colin A.: *See*—
Silverman, Michael W.; Heinrich, Michael; Brubaker, Clifford E.; and McLaurin, Colin A., 4,998,354, Cl. 33-514.200.
McMichael, James C.: *See*—
Skelley, Arthur P.; and McMichael, James C., 4,999,167, Cl. 422-175.000.
McNally, Lance; Morley, Peter; and Lotti, James W., to Bull HN Information Systems Inc. Hot extraction and insertion of logic boards in an on-line communication system. 4,999,787, Cl. 364-514.000.
McNeill, John D. Dispenser for toilet rolls. 4,998,681, Cl. 242-55.530.
MDT Corporation: *See*—
Calabra, Daniel; Hancock, Charles O.; and Avant, Brian, 4,999,165, Cl. 422-113.000.
Meade, Robert J., to Nalco Chemical Company. Fumed silica as a paint stripper thickener. 4,999,126, Cl. 252-162.000.
Meco Corporation: *See*—
Huff, George L.; Archer, Robert; and Haynes, James P., 4,998,774, Cl. 297-461.000.
Medeco Security Locks, Inc.: *See*—
Hyatt, Richard G., Jr.; and Hall, Charles E., 4,998,952, Cl. 70-395.000.
Medical Devices Limited Partnership: *See*—
Claxton, Philander P., III; McDade, George L.; and Schaffer, Jon D., 4,998,534, Cl. 128-670.000.
Medice Chem.-Pharm. Fabrik Putter GmbH & Co. KG: *See*—
Paradies, Henrich H., 4,999,435, Cl. 248-326.000.
Meehan, Frank. Package for a liquid sample and an associated method for packaging a liquid sample. 4,998,621, Cl. 206-466.000.
Mehdian, Seyed M. H. Apparatus for use in the treatment of spinal disorders. 4,998,936, Cl. 606-61.000.
Mehta, Rajendra; Lakes, Dale; and Saluke, William, to Standard Register Co., The. Protective coating for thermal images. 4,999,334, Cl. 503-226.000.
Melannco International Ltd.: *See*—
Gordon, Melvin L., 4,998,361, Cl. 40-152.000.
Melcher, Richard G.; and Cortes, Hernan J., to Dow Chemical Company, The. Apparatus for membrane assisted liquid chromatography. 4,999,105, Cl. 210-198.200.
Mele, Mary K.: *See*—
Mele, Thomas C.; Mele, Mary K.; Dyer, Robert C.; and Dyer, Margaret A., 4,999,603, Cl. 340-323.00R.
Mele, Thomas C.; Mele, Mary K.; Dyer, Robert C.; and Dyer, Margaret A. Multi-functional basketball game monitoring unit. 4,999,603, Cl. 340-323.00R.
Mellors, Harry; and Johnson, Susan G., to British United Shoe Machinery Ltd. Cushion insole/insock material. 4,999,237, Cl. 428-280.000.
Melton, Lester L.: *See*—
Webster, Stephen J.; and Melton, Lester L., 4,999,329, Cl. 502-202.000.
Memmott, Vincent J.: *See*—
Thacker, Milton B.; Limburg, John M.; and Memmott, Vincent J., 4,999,100, Cl. 208-155.000.
Mendle, Johann: *See*—
Geyer, Gerhard; Mendle, Johann; and Dillmann, Hermann-Josef, 4,998,523, Cl. 123-502.000.
Menge, Heinrich. Toilet with apparatus for evacuating malodorous air from the bowl. 4,998,299, Cl. 4-349.000.
Merchant, Abid N., to Du Pont de Nemours, E. I., and Company. Azeotropic composition of 2-chloro-1,1,2-trifluoroethyl-2-difluoromethyl ether with trans-1,2-dichloroethylene and methnanol. 4,999,127, Cl. 252-171.000.
Merck & Co., Inc.: *See*—
Witzel, Bruce E.; Allison, Debra L.; Caldwell, Charles G.; and Rupprecht, Kathleen, 4,999,436, Cl. 549-45.000.
Merger, Franz; Horler, Hans; Hoelderich, Wolfgang; and Witzel, Tom, to BASF Aktiengesellschaft. Preparation of olefinically unsaturated carboxylic esters having a terminal ester group. 4,999,453, Cl. 560-211.000.
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Jones, Winton D.; Dage, Richard C.; Claxton, George P.; Cheng, Hsien C.; and Robinson, Phillip J., 4,999,431, Cl. 546-168.000.
Merrell Dow Pharmaceuticals Inc.: *See*—
Dage, Richard C.; and Schnettler, Richard A., 4,999,365, Cl. 514-341.000.

Schock, Herbert; Long, David F.; and Nadler, William R., 4,999,226, Cl. 424-472.000.
Merritt, Christopher R.: *See—*
Vogel, James C.; and Merritt, Christopher R., 4,998,501, Cl. 118-312.000.
Merz & Krell GmbH & Co., Firma: *See—*
Keil, Georg, 4,999,017, Cl. 401-32.000.
Meshkova, Taisa A.: *See—*
Solodovnik, Valentin D.; Solodkaya, Tatyana I.; Litvinova, Maria T.; Meshkova, Taisa A.; Usova, Alexandra V.; and Davydov, Anatoly B., 4,999,188, Cl. 424-78.000.
Metal Research Corporation: *See—*
Ototani, Tohei; Degawa, Toru; Kusumoto, Kanichi; and Ebata, Makoto, 4,999,053, Cl. 75-564.000.
Metallurg, Inc.: *See—*
Fray, Derek J., 4,999,092, Cl. 204-68.000.
Meyer, Craig H.; and Pauly, John M., to Leland Stanford Junior University, The Board of Trustees of the. magnetic resonance imaging and spectroscopy using a single excitation pulse for simultaneous spatial and spectral selectivity. 4,999,580, Cl. 324-309.000.
Meyer, David P., to Universal Golf Supply, Inc. Golf ball. 4,998,734, Cl. 273-235.00R.
Meyer, John: *See—*
Ralph, John T.; Beckley, Guy B.; Brady, Frank T.; Jelenek, Ivan; Korn, Darryl K.; Meyer, John; Nay, Daniel L.; Searle, Colin M.; Shick, David; Williams, Richard W.; and Wilson, Jon C., deceased, 4,999,771, Cl. 364-200.000.
Meyer, Karen M.; Liggett, Michael D.; Conklin, Robert J.; and Barker, Charles J., to General Motors Corporation. Exhaust gas recirculation valve assembly. 4,998,707, Cl. 251-129.150.
Meyer, Norbert: *See—*
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,999,044, Cl. 71-92.000.
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Gerhard, Paul; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,999,045, Cl. 71-92.000.
Meyer, Robert G.; and Scotten, Jeffrey D., to North American Philips Corp; and Hewlett-Packard Co. Wideband class AB CRT cathode driver. 4,999,586, Cl. 330-288.000.
Meyer, Walter C., to Du Pont de Nemours, E. I., and Company. Monofunctional alcohols to prevent gelation in two component isocyanate coatings. 4,999,213, Cl. 427-27.000.
Meyer, William F., to Percutaneous Technologies Inc. Endoscopic abdominal, urological, and gynecological tissue removing device. 4,998,527, Cl. 128-6.000.
Meyer, Willy: *See—*
Waldner, Adrian; and Meyer, Willy, 4,999,426, Cl. 544-127.000.
Michael, David J. Rebonded fused brick. 4,999,325, Cl. 501-115.000.
Michael Horauf Maschinenfabrik GmbH & Co. KG: *See—*
Karolyi, Oskar, 4,998,669, Cl. 229-170.000.
Micron Technology, Inc.: *See—*
Lowrey, Tyler A.; and Doan, Trung T., 4,999,160, Cl. 420-529.000.
Midavaine, Thierry, to SAT (Societe Anonyme de Telecommunications). Device for generating an infrared image. 4,999,502, Cl. 250-495.100.
Mihara, Masahito, to Murata Manufacturing Co., Ltd. Degaussing circuit for CRT. 4,999,732, Cl. 361-150.000.
Miki, Ichiro: *See—*
Oshima, Etsuo; Obase, Hiroyuki; Karasawa, Akira; Kubo, Kazuhiro; Miki, Ichiro; and Ishii, Akio, 4,999,363, Cl. 514-332.000.
Miklosi, Stefan: *See—*
Schreiter, Thomas; Reihl, Peter; Miklosi, Stefan; Reinsch, Burkhard; Wingen, Bernhard; Patz, Wernèr; and Furst, Arpad, 4,998,771, Cl. 296-217.000.
Miksitz, Frank J., to UFI, Inc. Self-propelled balancing three-wheeled vehicle. 4,998,596, Cl. 180-213.000.
Milan, Otto G.; and Witczak, Stanley, to AM International, Inc. Copy sheet holddown system. 4,998,715, Cl. 271-197.000.
Miles Inc.: *See—*
Robertson, Steven, 4,999,304, Cl. 436-45.000.
Miles, Simon J.: *See—*
Holt, John B.; Miles, Simon J.; and Wilkin, Arthur L., 4,998,945, Cl. 47-1.010.
Miller, Darwin A.: *See—*
Miller, Ronnie F.; Dwyer, Arthur L.; Miller, Darwin A.; and Miller, Darwin L., 4,998,435, Cl. 73-40.700.
Miller, Darwin L.: *See—*
Miller, Ronnie F.; Dwyer, Arthur L.; Miller, Darwin A.; and Miller, Darwin L., 4,998,435, Cl. 73-40.700.
Miller, Merrill M.: *See—*
Garner, Harold E.; Miller, Merrill M.; Kavanagh, Brian E.; and Spring, Gorden W., 4,998,902, Cl. 446-2.000.
Miller, Ronnie F.; Dwyer, Arthur L.; Miller, Darwin A.; and Miller, Darwin L., to Damco Testers, Inc. Method and apparatus for leak testing of pipe. 4,998,435, Cl. 73-40.700.
Milliken Research Corporation: *See—*
Dischler, Louis, 4,999,072, Cl. 156-145.000.
Fowler, James E., 4,999,231, Cl. 428-95.000.
Reinholtz, Charles F., 4,998,942, Cl. 28-245.000.
Sollars, John A., 4,999,488, Cl. 250-222.200.
Milone, Carmine, to Mirage S.r.l. Flexible bar for spectacles and manufacturing method. 4,999,008, Cl. 351-113.000.
Milton, Mitchell J.: *See—*
Vogel, Richard M.; and Milton, Mitchell J., 4,999,714, Cl. 358-337.000.
Mimura, Shinji, to Kabushiki Kaisha Mimura Sogo Kenkyuusho. Continuous injector of liquid medicine. 4,998,918, Cl. 604-132.000.
MindGames, Inc.: *See—*
Blackwell, George L., III, 4,998,735, Cl. 273-249.000.
Miner Enterprises, Inc.: *See—*
Carlston, Robert L., 4,998,997, Cl. 267-003.000.
Miner, Lynn M.: *See—*
Koslover, Robert A.; Cremer, Charles D.; Geren, William P.; Voss, Donald E.; and Miner, Lynn M., 4,999,591, Cl. 333-21.00R.
Minnesota Mining and Manufacturing Company: *See—*
Incremona, Joseph H.; and Lundeen, Richard H., 4,999,076, Cl. 156-241.000.
Yafuso, Masao; and Hui, Henry K., 4,999,306, Cl. 436-68.000.
Minolta Camera Kabushiki Kaisha: *See—*
Kamitani, Masatoshi; and Fujiwara, Toshihiro, 4,999,658, Cl. 354-225.000.
Kuroda, Hirokazu; Nakai, Masaaki; Katoh, Takehiro; Ohya, Tetsuro; Izumi, Shuji; and Okuno, Akira, 4,999,665, Cl. 354-468.000.
Sakamoto, Mitsutoshi, 4,999,267, Cl. 430-58.000.
Tange, Keigo, 4,999,678, Cl. 355-297.000.
Minoura, Norihiko; Aiba, Seiichi; and Fujiwara, Yukihiko, to Director-General of Agency of Industrial Science and Technology. Culture of cells. 4,999,297, Cl. 435-240.230.
Mirage S.r.l.: *See—*
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Mischanin, Vasily G.: *See—*
Paton, Boris E.; Voropai, Nikolai M.; Nikiforov, Boris A.; Schegolev, Georgy A.; Logiiko, Gennady P.; and Mischanin, Vasily G., 4,999,479, Cl. 219-145.220.
Misra, Ashok; David, Donald J.; and DasGupta, Arijit M., to Monsanto Company. Reducing blocking and increasing flow of plasticized polyvinyl butyral sheet. 4,999,078, Cl. 156-327.000.
Misra, Ashok; David, Donald J.; and DasGupta, Arijit M., to Monsanto Company. Polyvinyl butyral sheet. 4,999,253, Cl. 428-515.000.
Mr. Coffee, Inc.: *See—*
Fuchs, Donald C., Jr., 4,999,470, Cl. 219-10.55E.
Misumi, Teruo, to Canon Kabushiki Kaisha. Plasma CVD apparatus. 4,998,968, Cl. 118-723.000.
Mita Industrial Co., Ltd.: *See—*
Okumura, Keiji; and Matsunobu, Kenichi, 4,998,716, Cl. 271-297.000.
Mitani, Hiroshi: *See—*
Onodera, Hiromi; Inaji, Toshio; Yoshiura, Tsukasa; Wakabayashi, Noriaki; Mitani, Hiroshi; and Tokura, Mitsuo, 4,999,558, Cl. 318-685.000.
Mitchell, Edgar D. Kneeling aid and method of use. 4,998,298, Cl. 4-254.000.
Mitchell, Jack H. Retractable wire barb for fish hook. 4,998,375, Cl. 43-43.160.
Mitchell, James E., to Boeing Company, The. Automatic reconfiguration of electronic landing display. 4,999,780, Cl. 364-428.000.
Mitchell, Scott: *See—*
Williams, Anthony B.; Redford, Kenneth M.; Mitchell, Scott; and Bussell, Richard N., 4,999,524, Cl. 307-54.000.
Mito, Kunihiko: *See—*
Tenmoku, Kenji; Shimizu, Osamu; Shimizu, Toshiyuki; and Mito, Kunihiko, 4,999,783, Cl. 364-450.000.
Mitschker, Alfred: *See—*
Dobuler, Walter; Schul, Wolfgang; Paust, Joachim; and Mitschker, Alfred, 4,999,112, Cl. 210-656.000.
Mitsuaki, Horiuch: *See—*
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Mitsubishi Denki K.K.: *See—*
Fujita, Teruo, 4,999,826, Cl. 369-44.410.
Mitsubishi Denki Kabushiki Kaisha: *See—*
Hara, Kunihiko; Kojima, Keisuke; and Kyuma, Kazuo, 4,999,688, Cl. 357-19.000.
Hirokawa, Masayuki, 4,999,768, Cl. 364-200.000.
Kaga, Atsushi; and Nakamoto, Masahiko, 4,999,561, Cl. 318-812.000.
Naka, Shigeaki, 4,999,554, Cl. 318-569.000.
Okuno, Yoshihiro; and Kuramitsu, Yohichi, 4,999,698, Cl. 357-45.000.
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Suzuki, Shigehiko, 4,998,601, Cl. 187-107.000.
Mitsubishi Gas Chemical Company, Inc.: *See—*
Sugihara, Yasuo; and Shimokawa, Shigeki, 4,999,179, Cl. 423-584.000.
Mitsubishi Jukogyo Kabushiki Kaisha: *See—*
Fudono, Kanji; Ogawa, Hiroshi; Takahashi, Toshimasa; and Yamashita, Toshio, 4,998,582, Cl. 165-11.100.
Mitsubishi Paper Mills, Limited: *See—*
Emoto, Kazuhiro; Haino, Kozo; Itoh, Akira; and Okaji, Makoto, 4,999,269, Cl. 430-58.000.
Okumura, Fumio; Okada, Akinori; and Kondo, Kazuyoshi, 4,999,332, Cl. 503-209.000.
Mitsui Engineering and Ship Building Co., Ltd.: *See—*
Ototani, Tohei; Degawa, Toru; Kusumoto, Kanichi; and Ebata, Makoto, 4,999,053, Cl. 75-564.000.
Mitsui Engineering & Shipbuilidng Co., Ltd.: *See—*
Nakase, Noriaki; Hokkedo, Mamoru; Yamamoto, Etsuji; Yoshida, Masahiko; and Kitayama, Yuyaka, 4,999,089, Cl. 196-110.000.

Mitsui Petrochemical Industries: *See*—
Nakase, Noriaki; Hokkedo, Mamoru; Yamamoto, Etsuji; Yoshida, Masahiko; and Kitayama, Yuyaka, 4,999,089, Cl. 196-110.000.
Mitsumoto, Hisashi, to Nissan Motor Co., Ltd. Swirl control system for lean-burn engines. 4,998,518, Cl. 123-306.000.
Mitsuya, Yoshihide: *See*—
Kageyama, Hidehei; and Mitsuya, Yoshihide, 4,998,837, Cl. 401-85.000.
Miura, Akihiro: *See*—
Ishiko, Daisuke; Toda, Kazurou; Kamada, Osamu; and Miura, Akihiro, 4,999,571, Cl. 324-96.000.
Miyajima, Shunpei: *See*—
Hashimoto, Misao; Ito, Satoshi; Miyajima, Shunpei; Ito, Wataru; and Komori, Tadashi, 4,999,259, Cl. 428-685.000.
Miyamoto, Junichi: *See*—
Ohtsuka, Nobuaki; Miyamoto, Junichi; and Atsumi, Shigeru, 4,999,813, Cl. 365-201.000.
Miyamoto, Moritoshi: *See*—
Ito, Yuji; and Miyamoto, Moritoshi, 4,999,513, Cl. 250-575.000.
Miyamoto, Yoshinari; and Nakata, Hirohiko, to Osaka University; and Sumitomo Electric Industries, Ltd. Pressure self-combustion sintering method. 4,999,144, Cl. 264-56.000.
Miyanaga, Masaaki, to Kabushiki Kaisha Miyanaga. Bit for drilling an undercut hole. 4,998,981, Cl. 175-286.000.
Miyaoka, Senri, to Sony Corporation. Recording and/or reproducing apparatus for tape type optical recording medium. 4,999,827, Cl. 369-44.180.
Miyata, Chikara; Yasutake, Masatoshi; and Ishijima, Hiroshi, to Seiko Instruments Inc. Scanning tunneling microscope. 4,999,495, Cl. 250-306.000.
Miyata, Masanori; Komiya, Yutaka; Nakamura, Shinichi; Hirose, Masayuki; Mori, Toshihiko; and Nakayama, Tomobumi, to Canon Kabushiki Kaisha. Image forming apparatus having synthetic recording functions. 4,999,674, Cl. 355-218.000.
Miyazaki, Kunio: *See*—
Nihei, Masayasu; Onuki, Jin; Koubuchi, Yasushi; Miyazaki, Kunio; and Itagaki, Tatsuo, 4,999,096, Cl. 204-192.300.
Mizuguchi, Yoshifumi: *See*—
Sugimoto, Yoshinobu; Mizuguchi, Yoshifumi; and Hoshino, Yoshinobu, 4,999,247, Cl. 428-383.000.
Mizusawa, Nobutoshi; Tanaka, Yutaka; and Ebinuma, Ryuichi, to Canon Kabushiki Kaisha. Positioning mechanism. 4,999,506, Cl. 250-491.100.
Mizutani, Hiroyuki; and Moriyasu, Takashi, to Kabushiki Kaisha Toshiba. Method and apparatus for making inferences using frame-based knowledge representation. 4,999,786, Cl. 364-513.000.
Mizutani, Kenichiro; Tanaka, Seiya; and Ohmi, Atsushi, to Aisin Seiki Kabushiki Kaisha. Fluid coupling having damped bimetallic spring. 4,998,607, Cl. 192-58.00B.
Mizutani, Satoshi: *See*—
Shigeki, Terumitsu; and Mizutani, Satoshi, 4,998,692, Cl. 248-56.000.
Mobay Corporation: *See*—
Hunt, Robert N.; and Sandridge, Robert L., 4,999,498, Cl. 250-338.500.
Modine Manufacturing Company: *See*—
Guntly, Leon A.; and Costello, Norman F., 4,998,580, Cl. 165-133.000.
Modlin, Douglas: *See*—
Littlejohn, Douglas J.; Modlin, Douglas; Ingrum, Jerry G.; and Devlin, Brian R., 4,998,824, Cl. 356-407.000.
Moen, Russell R., Jr.: *See*—
Suter, Richard R.; and Moen, Russell R., Jr., 4,999,516, Cl. 307-296.300.
Mogi, Hirokazu: *See*—
Tsuji, Sadahiko; Hamano, Hiroyuki; Mogi, Hirokazu; Ogino, Shigeru; Noguchi, Kazuhiro; and Kobayashi, Takashi, 4,998,809, Cl. 350-500.000.
Mohaupt, John M.; and Riemenschneider, Mark R., to R. A. Jones & Co. Inc. Packaging container ejection apparatus. 4,998,910, Cl. 493-12.000.
Mohrman, John H. Solid waste processing unit. 4,998,675, Cl. 241-36.000.
Moll, John H.: *See*—
Yolton, Charles F.; Lizzi, Thomas; and Moll, John H., 4,999,051, Cl. 75-338.000.
Molnlycke AB: *See*—
Bjorksund, Margareta; and Widlund, Urban, 4,998,929, Cl. 604-385.200.
Moly, Jose , to Labinal S.A. Electrical connector. 4,998,889, Cl. 439-247.000.
Monahan, John J.: *See*—
Brunck, Terence K.; Larocca, David J.; and Monahan, John J., 4,999,421, Cl. 530-350.000.
Monarch Marking Systems, Inc.: *See*—
Cordery, Robert A.; and Hartings, Michael F., 4,999,641, Cl. 343-742.000.
Taylor, Bruce E., 4,998,834, Cl. 400-247.000.
Monnier, Alain: *See*—
Bordaz, Pascal; Giraud, Laurent; Monnier, Alain; and Prus, Eric, 4,998,672, Cl. 239-585.000.
Monsanto Company: *See*—
Fleet, George W. J.; Rademacher, Thomas W.; and Dwek, Raymond A., 4,999,360, Cl. 514-315.000.
Misra, Ashok; David, Donald J.; and DasGupta, Arijit M., 4,999,078, Cl. 156-327.000.
Misra, Ashok; David, Donald J.; and DasGupta, Arijit M., 4,999,253, Cl. 428-515.000.
Montalto, Samuel J.: *See*—
Barnett, Stanley M.; Lausier, Joan M.; and Montalto, Samuel J., 4,999,198, Cl. 424-449.000.
Montes, Hilario: *See*—
Reeves, Robert H., Jr.; Cox, Charles R.; and Montes, Hilario, 4,998,911, Cl. 493-108.000.
Montoye, Robert K.: *See*—
Cocanougher, Daniel; Montoye, Robert K.; Nguyenphu, Myhong; and Runyon, Stephen L., 4,999,802, Cl. 364-748.000.
Moody, Lawrence G.; Childress, Thomas E.; Pitrolo, Robert L.; Ritscher, James S.; and Leichliter, Ronald P., to Union Carbide Chemicals and Plastics Company Inc. Trimethoxysilane preparation via the methanol-silicon reaction with recycle. 4,999,446, Cl. 556-470.000.
Moore, Joe: *See*—
Lawler, Adrian; Schwark, Peter; and Moore, Joe, 4,998,370, Cl. 43-42.060.
Moore, Rosemary V. A. Process for knitting loop pile. 4,998,419, Cl. 66-25.000.
Moos, Walter H.: *See*—
Kester, Jeffrey A.; Moos, Walter H.; and Thomas, Anthony J., 4,999,430, Cl. 546-105.000.
Moracz, Donald J., to Compressor Components Textron Inc. Electrochemical machine electrode assembly. 4,999,093, Cl. 204-129.100.
Moreno, Gilbert C., to MSA Aircraft Interior Products, Inc. Reversing screw, aircraft window shade mechanism for a modular aircraft window. 4,998,576, Cl. 160-90.000.
Morgan, James V., Jr.; and Offord, Glen E., to AT&T Bell Laboratories. Programmable logic level input buffer. 4,999,529, Cl. 307-475.000.
Mori, Shinji, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Acceleration sensor for a retractable seat belt. 4,998,684, Cl. 242-107.40A.
Mori, Toshihiko: *See*—
Miyata, Masanori; Komiya, Yutaka; Nakamura, Shinichi; Hirose, Masayuki; Mori, Toshihiko; and Nakayama, Tomobumi, 4,999,674, Cl. 355-218.000.
Morigami, Takashi, to NEC Corporation. Constant current circuit. 4,999,567, Cl. 323-315.000.
Morii, HIroshi: *See*—
Azumi, Takeshi; Morii, HIroshi; Naito, Yasuyuki; and Sakabe, Yukio, 4,999,595, Cl. 333-184.000.
Morimoto, Akira: *See*—
Iizuka, Takashi; Iima, Mitsunori; and Morimoto, Akira, 4,998,790, Cl. 350-6.100.
Morimoto, Makoto: *See*—
Nakano, Hirofumi; Hara, Mitsunobu; Takahashi, Isami; Asano, Kozo; Iida, Takao; and Morimoto, Makoto, 4,999,196, Cl. 424-116.000.
Morimoto, Shingo, to Showa Denko Kabushiki Kaisha. Composite organic filaments. 4,999,244, Cl. 428-372.000.
Morimoto, Shuzo: *See*—
Hanyu, Susumu; Kasuga, Noboru; Hara, Kazumasa; and Morimoto, Shuzo, 4,998,491, Cl. 112-262.100.
Morishima, Yoichi; Kobayashi, Kazuo; and Suzuki, Isao, to Kabushiki Kaisha Toshiba. Electric motor running system employing photovoltaic array. 4,999,560, Cl. 318-779.000.
Morita, Tatsuo: *See*—
Yamaguchi, Teruzo; and Morita, Tatsuo, 4,999,477, Cl. 219-110.000.
Moritani, Tohei; Fukutome, Susumu; Motoishi, Yasuo; and Oda, Hidemasa, to Kuraray Co., Ltd. Multilayered packaging materials having high gas barrier property. 4,999,229, Cl. 428-36.600.
Moriyasu, Takashi: *See*—
Mizutani, Hiroyuki; and Moriyasu, Takashi, 4,999,786, Cl. 364-513.000.
Morley, Peter: *See*—
McNally, Lance; Morley, Peter; and Lotti, James W., 4,999,787, Cl. 364-514.000.
Morozumi, Eiichi; Tsumura, Takashi; and Inagaki, Hiroyuki, to Yamatake-Honeywell Co. Ltd. Flow control valve. 4,998,561, Cl. 137-630.140.
Morris, Brian G.: *See*—
Wood, Wendell L.; Morris, Brian G.; Aleshire, Dianne J.; and Katerberg, James A., 4,999,647, Cl. 346-75.000.
Morris, Glenn H., Sr. Condition indicating child-resistant cap. 4,998,632, Cl. 215-201.000.
Morris, William I.: *See*—
Sparer, Steven J.; and Morris, William I., 4,998,714, Cl. 271-117.000.
Mort, Thomas W.: *See*—
Joseph, Brian J.; Mort, Thomas W.; Stern, Philip A.; and Westcott, Robert M., 4,999,680, Cl. 355-326.000.
Morton International: *See*—
Choo, Tat Y., 4,999,114, Cl. 210-709.000.
Morton International, Inc.: *See*—
Paxton, Donald B.; Lauritzen, Donald R.; and Anderson, Scott R., 4,998,751, Cl. 280-741.000.
Moss, Hans, to AB Volvo. Tooth belt drive, especially for internal combustion engines. 4,998,906, Cl. 474-153.000.
Mothe, Gerard. Modular anti-intrusion barrier. 4,998,843, Cl. 404-6.000.
Motoishi, Yasuo: *See*—
Moritani, Tohei; Fukutome, Susumu; Motoishi, Yasuo; and Oda, Hidemasa, 4,999,229, Cl. 428-36.600.

Motorola, Inc.: *See*—
Anderson, Dale R., 4,999,593, Cl. 333-112.000.
Birger, Ari, 4,999,800, Cl. 364-748.000.
DeWitt, Bernard C.; and Ho, Ying-wai, 4,999,796, Cl. 364-715.080.
Gaynor, Michael P., 4,999,597, Cl. 333-246.000.
McCaslin, Shawn R.; and van Bavel, Nicholas R., 4,999,798, Cl. 364-724.100.
Rusznyak, Andreas, 4,999,521, Cl. 307-498.000.
Thompson, Charles D., 4,999,625, Cl. 341-118.000.

Mottet, Michael P.: *See*—
Holzapfel, Robert C.; Mottet, Michael P.; and Riggle, Thomas W., 4,998,394, Cl. 52-426.000.

Mouri, Takashi, to Casio Computer Co., Ltd.; and Casio Electronics Manufacturing Co., Ltd. Image forming apparatus having common signal lines. 4,999,676, Cl. 355-246.000.

Mouton, William J.; Grush, Robert; and Alton, Dolores B., to Garvey, Charles C., Jr., a part interest. Wave actuated coastal erosion reversal system for shorelines. 4,998,844, Cl. 405-21.000.

Mruk, William A.; Harrison, Daniel J.; and Campbell, Bruce C., to Eastman Kodak Company. Thermal dye transfer receiving element with blended polyethylene/polypropylene-coated paper support. 4,999,335, Cl. 503-227.000.

MSA Aircraft Interior Products, Inc.: *See*—
Moreno, Gilbert C., 4,998,576, Cl. 160-90.000.

Mtu Motoren- und Turbinen-Union Muenchen GmbH: *See*—
Weiler, Wolfgang, 4,998,739, Cl. 277-53.000.

Muetterties, Kurt A.: *See*—
White, David L.; Engelstad, Barry L.; and Muetterties, Kurt A., 4,999,445, Cl. 556-138.000.

Muir, Earl B., to Copeland Corporation. Scroll machine with reverse rotation protection. 4,998,864, Cl. 417-410.000.

Muller, Armin: *See*—
Ruhl, Thomas; Muller, Armin; and Hinrichs, Wolfgang, 4,999,778, Cl. 364-426.020.

Muller, Fritz: *See*—
Rudenauer, Werner; Muller, Fritz; and Furtmayr, Joachim, 4,998,476, Cl. 102-226.000.

Muller, Klaus: *See*—
Prestel, Helmut; and Muller, Klaus, 4,999,433, Cl. 548-260.000.

Multifastener Corporation: *See*—
Goodsmith, Dale H.; and Woods, Harold T., 4,998,659, Cl. 227-7.000.

Murakami, Azuma; Hagiwara, Teruyoshi; Tuchida, Yoichi; and Johno, Hideki, to Wacom Co., Ltd. Coordinates input apparatus. 4,999,461, Cl. 178-19.000.

Murakami, Junichi: *See*—
Ohta, Masakatsu; Yabu, Shuichi; and Murakami, Junichi, 4,998,821, Cl. 353-122.000.

Murakami, Tsutomu; and Kanai, Masahiro, to Canon Kabushiki Kaisha. Apparatus for forming functional deposited film by microwave plasma CVD process. 4,998,503, Cl. 118-723.000.

Murakami, Yoshiki: *See*—
Honda, Kazuyoshi; Sugita, Ryuji; Tohma, Kiyokazu; Kawawake, Yasuihiro; and Murakami, Yoshiki, 4,999,220, Cl. 427-132.000.

Muraoka, Kunihiko, to Fuji Jukogyo Kabushiki Kaisha. Power apparatus for diagnosing air bag equipment. 4,999,775, Cl. 364-424.030.

Murase, Teruo: *See*—
Ishikawa, Kouji; Kawano, Kyoichiro; Murase, Teruo; Sochor, Jerzy R.; and Norman, C. Timothy, 4,998,884, Cl. 439-49.000.

Murata Kikai Kabushiki Kaisha: *See*—
Akiyama, Yasuo, 4,998,566, Cl. 139-35.000.
Matsui, Isamu; Uehara, Masao; Sakai, Shoji; Noda, Koshi; and Kubota, Yasuhiko, 4,998,407, Cl. 57-328.000.

Murata Manufacturing Co., Ltd.: *See*—
Azumi, Takeshi; Morii, HIroshi; Naito, Yasuyuki; and Sakabe, Yukio, 4,999,595, Cl. 333-184.000.
Mihara, Masahito, 4,999,732, Cl. 361-150.000.

Murata, Sunao: *See*—
Hayano, Fuminori; Imamura, Kazunori; Murata, Sunao; and Kato, Kinya, 4,999,510, Cl. 250-571.000.

Murata Wiedemann, Inc.: *See*—
Chun, Victor L.; and Hunter, James R., 4,998,958, Cl. 83-133.000.

Murayama, Takashi; and Nii, Nobuaki, to Sanyo Electric Co., Ltd. Information filing apparatus. 4,999,790, Cl. 364-521.000.

Murch, Gerald M.: *See*—
Salibello, Cosmo; Torrey, Jonathan G.; Coffman, Steven G.; and Murch, Gerald M., 4,998,820, Cl. 351-243.000.

Murphy, Timothy C., Jr.: *See*—
Lennon, Donald J.; and Murphy, Timothy C., Jr., 4,999,163, Cl. 422-58.000.

Mushiage, Masato: *See*—
Sakiyama, Hajime; Tanaka, Haruo; and Mushiage, Masato, 4,999,841, Cl. 372-45.000.

Mushika, Yoshihiro: *See*—
Saji, Yoshito; Namoto, Yoshiteru; Mushika, Yoshihiro; and Yamashita, Haruo, 4,999,649, Cl. 346-134.000.

Mutch, Henry, to Rohr Industries, Inc. Thrust reverser torque ring. 4,998,409, Cl. 60-226.200.

Mycogen Corporation: *See*—
Payne, Jewel; and Soares, George G., 4,999,192, Cl. 424-93.000.

Nabisco Brands, Inc.: *See*—
Lengerich, Bernhard V.; Haynes, Lynn C.; Levine, Harry; Otterburn, Michael S.; Mathewson, Paul; and Finley, John, 4,999,208, Cl. 426-549.000.

Nadkarni, Anil; Samal, Prasan K.; and Synk, James E., to SCM Metal Products, Inc. Dispersion strengthened metal composites. 4,999,336, Cl. 505-1.000.

Nadler, William R.: *See*—
Schock, Herbert; Long, David F.; and Nadler, William R., 4,999,226, Cl. 424-472.000.

Nagano, Masashi: *See*—
Sawada, Keiichi; and Nagano, Masashi, 4,998,907, Cl. 474-206.000.

Nagaoka, Tatsuo. Bulb slitter. 4,998,466, Cl. 99-591.000.

Nagaoka, Tatsuo. Bulb centering clamp apparatus. 4,998,468, Cl. 99-636.000.

Nagasawa, Kenichi: *See*—
Kozuki, Susumu; Ushiro, Tatsuzo; Masui, Toshiyuki; Takei, Masahiro; and Nagasawa, Kenichi, 4,999,722, Cl. 360-77.150.

Nagashima, Hisao: *See*—
Sato, Hideaki; Nagashima, Hisao; Fujiwara, Kenichi; and Kitamura, Keiichi, 4,998,413, Cl. 62-149.000.

Nagashima, Nao, to Canon Kabushiki Kaisha. Image reading apparatus. 4,999,717, Cl. 358-448.000.

Nagata, Hiroo: *See*—
Yamazaki, Etsuo; and Nagata, Hiroo, 4,999,555, Cl. 318-578.000.

Nagatomo, Toshihiro, to Seicon Co., Ltd. Animal intestine incising apparatus. 4,998,324, Cl. 452-149.000.

Nagayoshi, Akio; and Nagayoshi, Kiyoharu, to UC Industry Co., Ltd. Plastic pipe. 4,998,563, Cl. 138-122.000.

Nagayoshi, Kiyoharu: *See*—
Nagayoshi, Akio; and Nagayoshi, Kiyoharu, 4,998,563, Cl. 138-122.000.

Naito, Yasuyuki: *See*—
Azumi, Takeshi; Morii, HIroshi; Naito, Yasuyuki; and Sakabe, Yukio, 4,999,595, Cl. 333-184.000.

Naka, Shigeaki, to Mitsubishi Denki Kabushiki Kaisha. Method of loading control program for numerical control apparatus. 4,999,554, Cl. 318-569.000.

Nakae, Hiroyuki: *See*—
Ishiwata, Shinichi; Ueyama, Michio; Nakae, Hiroyuki; Funayama, Yoshiyuki; Iwamoto, Kazushige; and Noguchi, Isamu, 4,999,242, Cl. 428-345.000.

Nakagaki, Shintaro: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Suzuki, Tetsuji, 4,999,712, Cl. 358-213.110.

Nakagawa, Jun: *See*—
Ohashi, Mitsuo; Nakagawa, Jun; and Takahashi, Kuniyoshi, 4,999,578, Cl. 324-158.00F.

Nakagawa, Yoshitomo, to Seiko Instruments, Inc. Inductively coupled plasma mass spectrometry apparatus. 4,999,492, Cl. 250-281.000.

Nakagome, Yoshinobu: *See*—
Kitsukawa, Goro; Yanagisawa, Kazumasa; Kawahara, Takayuki; Hori, Ryoichi; Nakagome, Yoshinobu; Hamma, Noriyuki; Itoh, Kiyoo; and Tukada, Hiromi, 4,999,519, Cl. 307-446.000.

Nakahara, Toshiaki: *See*—
Tanikawa, Hirohide; Nakahara, Toshiaki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Sakashita, Kiichiro, 4,999,272, Cl. 430-106.600.

Nakai, Masaaki: *See*—
Kuroda, Hirokazu; Nakai, Masaaki; Katoh, Takehiro; Ohya, Tetsuro; Izumi, Shuji; and Okuno, Akira, 4,999,665, Cl. 354-468.000.

Nakamoto, Masahiko: *See*—
Kaga, Atsushi; and Nakamoto, Masahiko, 4,999,561, Cl. 318-812.000.

Nakamura, Eitaro; and Arai, Toyoichi, to Nippon Zeon Co., Ltd. Process for manufacturing laminated safety glass. 4,999,071, Cl. 156-99.000.

Nakamura, Hiroaki, to Olympus Optical Co., Ltd. Flash device. 4,999,663, Cl. 354-415.000.

Nakamura, Hiroaki: *See*—
Suzuki, Kenji; and Nakamura, Hiroaki, 4,999,668, Cl. 355-38.000.

Nakamura, Kazuyuki: *See*—
Ojima, Fumio; Mashimo, Kiyokazu; Hozumi, Masahiko; Hoshizaki, Taketoshi; and Nakamura, Kazuyuki, 4,999,268, Cl. 430-59.000.

Nakamura, Makoto: *See*—
Fukuyasu, Shigeki; Nakamura, Makoto; Kawachi, Kyozo; Yamaguchi, Seiji; Kinoshita, Sakan; and Numata, Tadashi, 4,999,203, Cl. 426-46.000.

Nakamura, Masaaki: *See*—
Ueda, Ryuichi; Nakamura, Masaaki; Iwasaki, Toshio; Hirota, Kanji; and Nakamura, Tetsuya, 4,999,614, Cl. 340-588.000.

Nakamura, Sazo: *See*—
Nishio, Hiroaki; Kato, Akira; and Nakamura, Sazo, 4,999,157, Cl. 419-68.000.

Nakamura, Seiji, to Ricoh Company, Ltd. Facsimile communication method and facsimile machine. 4,999,716, Cl. 358-434.000.

Nakamura, Shinichi: *See*—
Miyata, Masanori; Komiya, Yutaka; Nakamura, Shinichi; Hirose, Masayuki; Mori, Toshihiko; and Nakayama, Tomobumi, 4,999,674, Cl. 355-218.000.

Nakamura, Takashi; and Takahashi, Kenji, to Fuji Photo Film Co., Ltd. Radiation image recording and reproducing method. 4,999,515, Cl. 250-484.100.

Nakamura, Tetsuya: *See*—
Ueda, Ryuichi; Nakamura, Masaaki; Iwasaki, Toshio; Hirota, Kanji; and Nakamura, Tetsuya, 4,999,614, Cl. 340-588.000.

Nakamura, Toshiya: *See—*
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,736, Cl. 361-321.000.
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,737, Cl. 361-321.000.
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,738, Cl. 361-321.000.
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,739, Cl. 361-321.000.

Nakanishi, Shingo; and Yamamoto, Susumu, to Aisan Kogyo Kabushiki Kaisha; and Fuji Electric Co., Ltd. Brushless DC pump with enclosed circuit board. 4,998,865, Cl. 417-423.700.

Nakano, Hirofumi; Hara, Mitsunobu; Takahashi, Isami; Asano, Kozo; Iida, Takao; and Morimoto, Makoto, to Kyowa Hakko Kogyo Co., Ltd. Compound DC-107 produced by Streptomyces sp. 4,999,196, Cl. 424-116.000.

Nakase, Noriaki; Hokkedo, Mamoru; Yamamoto, Etsuji; Yoshida, Masahiko; and Kitayama, Yuyaka, to Mitsui Engineering & Shipbuilidng Co., Ltd.; and Mitsui Petrochemical Industries. Cracking furnace. 4,999,089, Cl. 196-110.000.

Nakashima, Shigeo: *See—*
Shimizu, Masami; Nakashima, Shigeo; Fujiwara, Yutaka; and Eguchi, Masaharu, 4,999,656, Cl. 354-195.120.

Nakata, Hirohiko: *See—*
Miyamoto, Yoshinari; and Nakata, Hirohiko, 4,999,144, Cl. 264-56.000.

Nakatani, Tetsuji; and Watanabe, Akira, to Fujitsu Limited. Second-harmonic-wave chocking filter. 4,999,596, Cl. 333-204.000.

Nakayama, Tomobumi: *See—*
Miyata, Masanori; Komiya, Yutaka; Nakamura, Shinichi; Hirose, Masayuki; Mori, Toshihiko; and Nakayama, Tomobumi, 4,999,674, Cl. 355-218.000.

Nakayama, Yoshiaki: *See—*
Tozaki, Katutoshi; and Nakayama, Yoshiaki, 4,999,719, Cl. 360-35.100.

Nalco Chemical Company: *See—*
Fong, Dodd W., 4,999,456, Cl. 564-207.000.
Meade, Robert J., 4,999,126, Cl. 252-162.000.
Pierce, Claudia C.; Grattan, David A.; and Fong, Dodd W., 4,999,161, Cl. 422-12.000.

Namoto, Yoshiteru: *See—*
Saji, Yoshito; Namoto, Yoshiteru; Mushika, Yoshihiro; and Yamashita, Haruo, 4,999,649, Cl. 346-134.000.

Nanno, Ikuo: *See—*
Oshima, Zinichiro; Uchiyama, Kiyoshi; and Nanno, Ikuo, 4,998,859, Cl. 414-680.000.

Nanoquest (Canada) Inc.: *See—*
Shaw, David A.; and Herriot, Glen A., 4,999,496, Cl. 250-310.000.

Narayanan, G. Hari: *See—*
Curtis, R. Eugene; Narayanan, G. Hari; and Quist, William E., 4,999,061, Cl. 148-12.70A.

Nardone, Vincent C.: *See—*
Prewo, Karl M.; Nardone, Vincent C.; and Strife, James R., 4,999,256, Cl. 428-552.000.

National Energy Council: *See—*
Cronje, Izak J.; Cloete, Thomas E.; and Dekker, Johannes, 4,999,202, Cl. 424-683.000.

National Research Development Corporation: *See—*
Holt, John B.; Miles, Simon J.; and Wilkin, Arthur L., 4,998,945, Cl. 47-1.010.
Schram, Cornelius J., 4,998,553, Cl. 137-13.000.

National Semiconductor Corp.: *See—*
Amin, Alaaeldin, 4,999,812, Cl. 365-185.000.
Buynoski, Matthew S., 4,999,309, Cl. 437-15.000.

Natsume, Shigeo: *See—*
Hamano, Toshio; and Natsume, Shigeo, 4,999,319, Cl. 437-209.000.

Navistar International Transportation Corp.: *See—*
Londt, Edward E.; and Robinson, Duane S., 4,998,592, Cl. 180-89.120.

Nay, Daniel L.: *See—*
Ralph, John T.; Beckley, Guy B.; Brady, Frank T.; Jelenek, Ivan; Korn, Darryl K.; Meyer, John; Nay, Daniel L.; Searle, Colin M.; Shick, David; Williams, Richard W.; and Wilson, Jon C., deceased, 4,999,771, Cl. 364-200.000.

NDC Company Ltd.: *See—*
Imai, Kiyoshi, 4,999,257, Cl. 428-555.000.

Neale, Robert S.; and Schilling, Curtis L., Jr., to Union Carbide Chemicals and Plastics Company Inc. Silicone-urethane copolymers. 4,999,412, Cl. 528-28.000.

Nebashi, Tutomu; Yabe, Shinichi; Yamaguchi, Nobuyoshi; Takizawa, Shuichi; and Sai, Fumio, to Kao Corporation. High-density granular concentrated detergent composition. 4,999,138, Cl. 252-543.000.

NEC Corporation: *See—*
Akashi, Mineo, 4,999,807, Cl. 364-900.000.
Fujiwara, Ryuhei, 4,999,836, Cl. 370-110.100.
Hayashi, Yoshihiro, 4,998,665, Cl. 228-180.100.
Horikawa, Akinori, 4,999,838, Cl. 371-16.100.
Morigami, Takashi, 4,999,567, Cl. 323-315.000.
Nukiyama, Tomoji, 4,999,804, Cl. 364-784.000.
Yamazaki, Toru, 4,999,517, Cl. 307-446.000.

NEC Home Electronics Ltd.: *See—*
Ohashi, Mitsuo; Nakagawa, Jun; and Takahashi, Kuniyoshi, 4,999,578, Cl. 324-158.00F.

Negishi, Akira: *See—*
Kondo, Kiyoshi; Matsui, Kiyohide; Negishi, Akira; and Takahatakae, Yuriko, 4,999,451, Cl. 560-124.000.

Negishi, Kiyoshi; Negoro, Ikuo; and Kita, Masahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Computer controlled timer for main drive pulse of form feed motor. 4,998,835, Cl. 400-611.000.

Negoro, Ikuo: *See—*
Negishi, Kiyoshi; Negoro, Ikuo; and Kita, Masahiro, 4,998,835, Cl. 400-611.000.

Negus, Daniel K., to Coherent, Inc. Stabilized synchronously pumped dye laser. 4,999,840, Cl. 372-18.000.

Neinast, James E.; and Neinast, Mark E. Electric arc system for ablating a surface coating. 4,999,472, Cl. 219-56.220.

Neinast, Mark E.: *See—*
Neinast, James E.; and Neinast, Mark E., 4,999,472, Cl. 219-56.220.

Nelson, Gregory J.; and Phelps, Frederick G., to Nelson, Gregory J. Mooring system for vessels. 4,998,497, Cl. 114-230.000.

Nelson, Gunner E., to Ethyl Corporation. Preparation of alkyl silanes. 4,999,447, Cl. 556-478.000.

Nelson, Thomas E., to Soltech, Inc. Appliance construction including a sealing device. 4,998,970, Cl. 126-376.000.

Nemes, Jozsef: *See—*
Soos, Rudolf; Nemes, Jozsef; Szelestei, Miklos; Schler, Istvan; Vidra, Laszlo ; and Szekely, Istvan, 4,999,454, Cl. 560-213.000.

Nerli, Robert. Dental syringe safety sheath apparatus. 4,998,880, Cl. 433-80.000.

Nerovny, Mikhail T.: *See—*
Evstratov, Jury I.; Kononov, Viktor V.; Sandigursky, Oleg L.; Nerovny, Mikhail T.; Larionov, Sergei V.; and Evstratov, Oleg I., 4,998,846, Cl. 405-78.000.

Nessfield, Stanley, to Sea Containers Ltd. Container door. 4,998,634, Cl. 220-1.500.

Nestac S.A.: *See—*
Wursch, Pierre, 4,999,197, Cl. 424-195.100.

Nestec S.A.: *See—*
Berger, Manfred; Spielmann, Daniele; and Traitler, Helmut, 4,999,380, Cl. 514-558.000.

Nestle, Mark: *See—*
Distefano, Joseph; Haas, Roger; Nestle, Mark; and Kelley, Fred D., 4,998,658, Cl. 226-95.000.

Neubert, Paul: *See—*
Klimke, Peter; and Neubert, Paul, 4,998,306, Cl. 4-619.000.

Neurodynamics, Inc.: *See—*
Ghajar, Jamshid B. G.; Ghadjar, Fathali G.; and Hariri, Robert J., 4,998,938, Cl. 606-130.000.

New England Biolabs, Inc.: *See—*
Barsomian, Janet M.; and Wilson, Geoffrey G., 4,999,293, Cl. 435-172.300.
Looney, Mary E. C.; and Wilson, Geoffrey G., 4,999,294, Cl. 435-172.300.

New England Medical Center Hospitals, Univ. of Washington, Inc.: *See—*
Selker, Harry P.; Wagner, Galen S.; Weaver, W. Douglas; and Califf, Robert M., 4,998,535, Cl. 128-696.000.

Newcomer, Kevin; and Richter, Steve, to QED Environmental Systems, Inc. Floating layer recovery apparatus. 4,998,585, Cl. 166-105.000.

Newnham, Robert E.; Xu, Qichang C.; and Yoshikawa, Shoko, to Pennsylvania Research Corporation, The. Transformed stress direction acoustic transducer. 4,999,819, Cl. 367-157.000.

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Nguyen, Phuc D.: *See—*
Scarbrough, Edward C.; Antich, Pietro P.; John, Berchmans; and Nguyen, Phuc D., 4,998,912, Cl. 600-6.000.

Nguyen, Tan H., to Etablissements Guyomarc'h S.A. Feed additive for animals, feeds containing such an additive and method for improving the growth of animals. 4,999,193, Cl. 424-93.000.

Nguyenphu, Myhong: *See—*
Cocanougher, Daniel; Montoye, Robert K.; Nguyenphu, Myhong; and Runyon, Stephen L., 4,999,802, Cl. 364-748.000.

Niche Design, Inc.: *See—*
Groetzinger, Charles R., 4,998,484, Cl. 108-42.000.

Nickel, Daniel J.: *See—*
Barth, John E., Jr.; Drake, Charles E.; Hovis, William P.; Kalter, Howard L.; Kelley, Gordon A., Jr.; Lewis, Scott C.; Nickel, Daniel J.; and Yankosky, James A., 4,999,815, Cl. 365-230.060.

Nicoud, Daniel: *See—*
Schultz, Jean-Pierre; Soler, Jean; and Nicoud, Daniel, 4,999,474, Cl. 219-74.000.

Nigrelli Systems, Inc.: *See—*
Lutzke, Wayne S.; and Balz, Michael A., 4,998,399, Cl. 53-398.000.

Nihei, Masayasu; Onuki, Jin; Koubuchi, Yasushi; Miyazaki, Kunio; and Itagaki, Tatsuo, to Hitachi, Ltd. Method of and apparatus for sputtering. 4,999,096, Cl. 204-192.300.

Niho, Yoji G., to Hughes Aircraft Company. Phase difference auto focusing for synthetic aperture radar imaging. 4,999,635, Cl. 342-25.000.

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Kawamata, Seizi, 4,998,638, Cl. 220-626.000.

Nii, Nobuaki: *See—*
Murayama, Takashi; and Nii, Nobuaki, 4,999,790, Cl. 364-521.000.

Niino, Hiroaki, to Canon Kabushiki Kaisha. Method for washing deposition film-forming device. 4,998,979, Cl. 134-1.000.
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Paton, Boris E.; Voropai, Nikolai M.; Nikiforov, Boris A.; Schegolev, Georgy A.; Logiiko, Gennady P.; and Mischanin, Vasily G., 4,999,479, Cl. 219-145.220.
Nikko Corporation Ltd.: *See*—
Iguchi, Atushi, 4,999,467, Cl. 219-10.493.
Nikon Corporation: *See*—
Hayano, Fuminori; Imamura, Kazunori; Murata, Sunao; and Kato, Kinya, 4,999,510, Cl. 250-571.000.
Sakamoto, Hideaki; and Amano, Kesayoshi, 4,999,669, Cl. 355-53.000.
Shibayama, Atsushi, 4,998,808, Cl. 350-427.000.
Niksic, Mark R.; and Erickson, Mark E., to T. A. Pelsue Company. Geodetic tent structure. 4,998,552, Cl. 135-102.000.
Nilsson, Stig L., to Electric Power Research Institute. Apparatus for controlling the reactive impedance of a transmission line. 4,999,565, Cl. 323-210.000.
Nippon Air Brake Co., Ltd.: *See*—
Ishiwata, Ichiro; and Karasuyama, Tomomichi, 4,998,461, Cl. 92-248.000.
Nippon Electric Glass Co., Ltd.: *See*—
Itoi, Hideyuki; Yoshimura, Ryoji; and Kaizuka, Tsuneo, 4,999,039, Cl. 65-54.000.
Nippon Filcon Co., Ltd.: *See*—
Tate, Takuo, 4,998,569, Cl. 139-383.00A.
Nippon Gear Co., Ltd.: *See*—
Umezono, Shiro; and Maki, Minoru, 4,998,385, Cl. 51-287.000.
Nippon Hoso Kyokai: *See*—
Nishida, Yasuaki; Fujisawa, Katsuya; Fujita, Yoshihiro; Fujiwara, Masao; Yoshikawa, Shigeo; and Uetsuki, Masao, 4,998,800, Cl. 350-162.200.
Nippon Hyumukan Kabushiki Kaisha: *See*—
Chida, Shohei; Kozaki, Masami; Asahi, Toshinori; Ono, Chiyoaki; Iwasa, Seiji; Fukunaga, Taizou; and Takemura, Moriyuki, 4,998,776, Cl. 299-59.000.
Nippon Oil Company, Limited: *See*—
Kaminade, Tadahiro; Iida, Shigeki; Toya, Tomohiro; and Hara, Hajime, 4,999,416, Cl. 528-190.000.
Nippon Oil and Fats Co., Ltd.: *See*—
Sugimoto, Yoshinobu; Mizuguchi, Yoshifumi; and Hoshino, Yoshinobu, 4,999,247, Cl. 428-383.000.
Nippon Paint Co., Ltd.: *See*—
Seio, Mamoru; Nishijima, Kanji; and Ishikawa, Katsukiyo, 4,999,274, Cl. 430-190.000.
Nippon Petrochemicals Company, Limited: *See*—
Shimizu, Isoo; Matsumura, Yasuo; and Arai, Yutaka, 4,999,450, Cl. 560-101.000.
Nippon Piston Ring Co., Ltd.: *See*—
Hiraoka, Takeshi; Takeguchi, Shunsuke; and Kawai, Satoshi, 4,998,955, Cl. 74-567.000.
Nippon Rotary Nozzle Co., Ltd.: *See*—
Yamazaki, Noboru, 4,998,650, Cl. 222-599.000.
Nippon Sheet Glass Co., Ltd.: *See*—
Hamanaka, Kenjiro, 4,999,006, Cl. 350-162.120.
Nippon Soda Co., Ltd.: *See*—
Sato, Masayuki; Kobayashi, Noriyuki; Funamoto, Akihiko; and Kataoka, Yoshitoshi, 4,999,442, Cl. 556-14.000.
Nippon Steel Corp.: *See*—
Hashimoto, Misao; Ito, Satoshi; Miyajima, Shunpei; Ito, Wataru; and Komori, Tadashi, 4,999,259, Cl. 428-685.000.
Wake, Ryousuke; and Ezure, Kazuya, 4,999,258, Cl. 428-632.000.
Nippon Telegraph and Telephone Corporation: *See*—
Kurihara, Takashi; Matsumoto, Shiro; Kainou, Toshikuni; Kanbara, Hirohisa; and Kubodera, Kenichi, 4,999,139, Cl. 252-587.000.
Nippon Zeon Co., Ltd.: *See*—
Nakamura, Eitaro; and Arai, Toyoichi, 4,999,071, Cl. 156-99.000.
Nippondenso Co., Ltd.: *See*—
Sato, Hideaki; Nagashima, Hisao; Fujiwara, Kenichi; and Kitamura, Keiichi, 4,998,413, Cl. 62-149.000.
Nippondenso Co., Ltd: *See*—
Yamada, Takahiro; Kurahashi, Kazuyoshi; and Watanabe, Shyuji, 4,998,379, Cl. 49-138.000.
Nishida, Yasuaki; Fujisawa, Katsuya; Fujita, Yoshihiro; Fujiwara, Masao; Yoshikawa, Shigeo; and Uetsuki, Masao, to Nippon Hoso Kyokai; and Kuraray Company, Ltd. Optical low pass filter. 4,998,800, Cl. 350-162.200.
Nishijima, Kanji: *See*—
Seio, Mamoru; Nishijima, Kanji; and Ishikawa, Katsukiyo, 4,999,274, Cl. 430-190.000.
Nishikawa, Kazunori: *See*—
Haruna, Tohru; and Nishikawa, Kazunori, 4,999,393, Cl. 524-126.000.
Nishimura, Tetsuharu: *See*—
Ishizuka, Koh; Nishimura, Tetsuharu; Ishii, Satoshi; Kubota, Yoichi; and Tsukiji, Masaaki, 4,998,798, Cl. 350-115.000.
Nishio, Hiroaki; Kato, Akira; and Nakamura, Sazo, to NKK Corporation. Method for molding powders. 4,999,157, Cl. 419-68.000.
Nishiura, Masaharu; and Yamada, Katsumi, to Fuji Electric Co., Ltd. Method of making thin film solar cell array. 4,999,308, Cl. 437-4.000.
Nissan Motor Co., Ltd.: *See*—
Mitsumoto, Hisashi, 4,998,518, Cl. 123-306.000.
Sano, Akihiko, 4,998,451, Cl. 74-867.000.
Yuzuriha, Naoki; and Yamamoto, Yoshimi, 4,998,999, Cl. 280-777.000.
Nisshin Steel Company, Ltd.: *See*—
Uematsu, Yoshihiro; Shimizu, Isami; and Hiramatsu, Naoto, 4,999,159, Cl. 420-53.000.
Nitanda, Fumio: *See*—
Goto, Ryo; Tomitani, Tadafumi; Nitanda, Fumio; Toyoda, Manabu; and Ushijima, Makoto, 4,999,726, Cl. 360-120.000.
Nitta, Toshiyuki: *See*—
Matsuda, Hiroshi; Nitta, Toshiyuki; and Aoki, Toshiyuki, 4,999,135, Cl. 252-511.000.
Nitto Kohki Co., Ltd.: *See*—
Fukuda, Kenji; and Kazama, Yasuo, 4,998,353, Cl. 30-392.000.
Nittoku Kensetsu Kabushiki Kaisha: *See*—
Chida, Shohei; Kozaki, Masami; Asahi, Toshinori; Ono, Chiyoaki; Iwasa, Seiji; Fukunaga, Taizou; and Takemura, Moriyuki, 4,998,776, Cl. 299-59.000.
Niwa, Takashi: *See*—
Sakamoto, Kazuho; Niwa, Takashi; Suenaga, Haruo; and Matsumoto, Takahiro, 4,999,762, Cl. 363-144.000.
Nix, Richard A.; Branum, Leslie P.; Rei, Mark W.; and Schwartz, Michael L., to Automotive Products plc. Damper for hydraulic clutch actuator. 4,998,609, Cl. 192-109.00F.
Nixon, Duane B.; Palmer, Ralph P.; and Pritchett, Carl M., to Best Lock Corporation. Door handle return assembly. 4,998,760, Cl. 292-347.000.
NKK Corporation: *See*—
Nishio, Hiroaki; Kato, Akira; and Nakamura, Sazo, 4,999,157, Cl. 419-68.000.
Yamazaki, Noboru, 4,998,650, Cl. 222-599.000.
Nobis, George. Multiple arrangeable strip support for a bag. 4,998,695, Cl. 248-101.000.
Nobles, Anthony A.: *See*—
Chin, Albert K.; Nobles, Anthony A.; and Lai, Kwok Y., 4,998,972, Cl. 128-6.000.
Noda, Koshi: *See*—
Matsui, Isamu; Uehara, Masao; Sakai, Shoji; Noda, Koshi; and Kubota, Yasuhiko, 4,998,407, Cl. 57-328.000.
Nogle, Thomas D., to Chrysler Corporation. Neutral start switch to sense shift lever position. 4,998,450, Cl. 74-850.000.
Noguchi, Isamu: *See*—
Ishiwata, Shinichi; Ueyama, Michio; Nakae, Hiroyuki; Funayama, Yoshiyuki; Iwamoto, Kazushige; and Noguchi, Isamu, 4,999,242, Cl. 428-345.000.
Noguchi, Kazuhiro: *See*—
Tsuji, Sadahiko; Hamano, Hiroyuki; Mogi, Hirokazu; Ogino, Shigeru; Noguchi, Kazuhiro; and Kobayashi, Takashi, 4,998,809, Cl. 350-500.000.
Nohira, Hiroyuki; Kimura, Takashi; Abe, Tetsuya; Yamada, Yoko; and Yamagishi, Kazuhige, to Canon Kabushiki Kaisha; and Yamakawa Chemical Industry Co., Ltd. Optically active compound, process for producing same and liquid crystal composition containing same. 4,999,130, Cl. 252-299.010.
Nohtomi, Nobuo; and Saito, Hideaki, to Pioneer Electronic Corporation. Knob device. 4,998,318, Cl. 16-121.000.
Nolan, Denis P.: *See*—
Maletsky, Albert; Nolan, Denis P.; and Polito, Betty Jean, 4,998,928, Cl. 604-365.000.
Nomura, Minoru: *See*—
Ebihara, Masafumi; Akitomo, Takeshi; and Nomura, Minoru, 4,999,087, Cl. 162-301.000.
Noraxon Oy: *See*—
Eskelinen, Paavo, 4,999,584, Cl. 330-107.000.
Nordbeck, Ellis L. Underwater pneumatic horn. 4,998,499, Cl. 116-142.0FP.
Nordstrom, Mark B., to Samsonite Corporation. Garment bag with wheels and a detachable valet case. 4,998,603, Cl. 190-18.00A.
Noren, Gerry K.: *See*—
Gaske, Joseph; Krajewski, John J.; and Noren, Gerry K., 4,999,216, Cl. 427-44.000.
Norman, C. Timothy: *See*—
Ishikawa, Kouji; Kawano, Kyoichiro; Murase, Teruo; Sochor, Jerzy R.; and Norman, C. Timothy, 4,998,884, Cl. 439-49.000.
Norman, Edward C.; and Regina, Anne C., to Chubb National Foam, Inc. Alcohol resistant aqueous film forming firefighting foam. 4,999,119, Cl. 252-3.000.
Norman, Linn V. Rotatable roller and method of use. 4,998,940, Cl. 16-34.000.
Norsolor S.A.: *See*—
Garrigue, Roger; and Lalo, Jack, 4,999,455, Cl. 564-59.000.
North American Philips Corp: *See*—
Meyer, Robert G.; and Scotten, Jeffrey D., 4,999,586, Cl. 330-288.000.
North American Philips Corporation: *See*—
Cavallerano, Alan P.; Tsinberg, Mikhail; and Wittig, Karl, 4,999,701, Cl. 358-12.000.
Kigyos, Frank M., 4,998,779, Cl. 300-10.000.
North Carolina Central Univ., The: *See*—
Izydore, Robert A.; and Hall, Iris H., 4,999,366, Cl. 514-380.000.
Northern Engineering Industries PLC: *See*—
Stead, Ronald, 4,998,508, Cl. 122-4.00D.
Northern Telecom Limited: *See*—
Bender, David K.; and Lathrop, Richard R., Jr., 4,999,731, Cl. 361-119.000.
Dumoulin, Andre; and Gervais, Michel, 4,999,148, Cl. 264-174.000.

Smith, Kevin; and Zimmermann, Detlef, 4,999,459, Cl. 174-35.0GC.

Norton Company: *See*—
Bouchard, William L.; Cummings, Robert E.; Kalinowski, Paul W.; and Sudol, Charles W., 4,998,384, Cl. 51-168.000.
Foster, Bryan D.; and Fonzi, Frank, 4,998,879, Cl. 432-253.000.

Norton, Daniel J., to Harris Data Communications, Inc. Data processing display terminal. 4,999,542, Cl. 315-85.000.

Nova Pharmaceutical Corporation: *See*—
Domb, Abraham J., 4,999,417, Cl. 528-271.000.

NovaGene, Inc.: *See*—
Kit, Malon; and Kit, Saul, 4,999,296, Cl. 435-235.100.

Novo Nordisk A/S: *See*—
Watjen, Frank; and Hansen, Holger C., 4,999,353, Cl. 514-250.000.

Novopan Traeindustri A/S: *See*—
Bentsen, Aksel T., 4,999,390, Cl. 524-30.000.

Nozaki, Masahiro, to Toyoda Gosei Co., Ltd. Weather strip for motor vehicle. 4,998,946, Cl. 49-497.000.

Nukiyama, Tomoji, to NEC Corporation. Full adder with short signal propagation path. 4,999,804, Cl. 364-784.000.

Numata, Tadashi: *See*—
Fukuyasu, Shigeki; Nakamura, Makoto; Kawachi, Kyozo; Yamaguchi, Seiji; Kinoshita, Sakan; and Numata, Tadashi, 4,999,203, Cl. 426-46.000.

Numminen, Leo: *See*—
Palmu, Jukka; Olinonen, Eero; Numminen, Leo; Tolvanen, Jyrki; and Varis, Martti, 4,999,117, Cl. 210-744.000.

Oakes, Thomas R.; Pedersen, Daniel E.; and Majewski, Donna M., to Ecolab Inc. Disinfectant polymeric coatings from esters of α,β-unsaturated carboxylic acid and germicide. 4,999,386, Cl. 523-122.000.

Oakley, Robert V., to Baxter International Inc. Apparatus and method for periodic aseptic withdrawal of liquid samples from a sterile liquid source. 4,999,307, Cl. 436-180.000.

Obara Corporation: *See*—
Yamaguchi, Teruzo; and Morita, Tatsuo, 4,999,477, Cl. 219-110.000.

Obase, Hiroyuki: *See*—
Oshima, Etsuo; Obase, Hiroyuki; Karasawa, Akira; Kubo, Kazuhiro; Miki, Ichiro; and Ishii, Akio, 4,999,363, Cl. 514-332.000.

Obata, Masahiko: *See*—
Suzuki, Hideo; Matsushima, Shunichi; Obata, Masahiko; and Sakama, Masao, 4,998,457, Cl. 84-600.000.

Obergfell, Stephen D. Combination headband and ponytail holder. 4,998,544, Cl. 132-212.000.

O'Brien, Dexter T.: *See*—
Bellino, Joseph P.; Arnold, David; O'Brien, Dexter T.; and Goldman, Ira B., 4,999,464, Cl. 200-267.000.

Ochi, Kenji: *See*—
Kato, Yasuyuki; Matsuda, Masaaki; and Ochi, Kenji, 4,999,171, Cl. 423-112.000.

O'Connell, Mark E.; and Rozek, Roy J., to Thomas Industries Inc. Combination handle and jar bracket for pumps. 4,998,764, Cl. 294-146.000.

Oda, Hidemasa: *See*—
Moritani, Tohei; Fukutome, Susumu; Motoishi, Yasuo; and Oda, Hidemasa, 4,999,229, Cl. 428-36.600.

Oda, Jyujiro: *See*—
Baba, Fumiaki; and Oda, Jyujiro, 4,998,449, Cl. 74-844.000.

Odier, Philippe: *See*—
Baumard, Jean-Francois; Dubois, Bertrand; and Odier, Philippe, 4,999,182, Cl. 423-608.000.

Odom, James M.: *See*—
Gawel, Len J.; Ng, Thomas; Odom, James M.; and Ebersole, Richard C., 4,999,286, Cl. 435-7.320.

O'Donnell, Kevin M.: *See*—
Johnson, Roger E.; Jensen, Thomas C.; VanRossen, Edward C.; and O'Donnell, Kevin M., 4,998,769, Cl. 296-183.000.

Oetiker, Hans, to Hans Oetiker AG Maschioen- und Apparatefabrik. Balanced clamp structure. 4,998,326, Cl. 24-20.00R.

Offord, Glen E.: *See*—
Morgan, James V., Jr.; and Offord, Glen E., 4,999,529, Cl. 307-475.000.

Ofstein, David E., to Rampart Packaging Inc. Increased regrind use in coextruded structures. 4,999,254, Cl. 428-518.000.

Ogawa, Hiroshi: *See*—
Fudono, Kanji; Ogawa, Hiroshi; Takahashi, Toshimasa; and Yamashita, Toshio, 4,998,582, Cl. 165-11.100.

Ogawa, Masahiko, to Canon Kabushiki Kaisha. Recording and/or reproducing apparatus. 4,999,721, Cl. 360-74.100.

Ogawa, Yasumasa: *See*—
Kanda, Minoru; Komatsu, Mikio; Fujii, Yasuhiro; Abiko, Toshio; Masamoto, Kyoji; Ogawa, Yasumasa; and Hashimoto, Tuyoshi, 4,999,592, Cl. 333-26.000.

Ogilvie, Carson J.: *See*—
Sang, Jean V.; and Ogilvie, Carson J., 4,999,323, Cl. 501-103.000.

Ogino, Shigeru: *See*—
Tsuji, Sadahiko; Hamano, Hiroyuki; Mogi, Hirokazu; Ogino, Shigeru; Noguchi, Kazuhiro; and Kobayashi, Takashi, 4,998,809, Cl. 350-500.000.

Ohashi, Mitsuo; Nakagawa, Jun; and Takahashi, Kuniyoshi, to NEC Home Electronics Ltd. Function inspecting system. 4,999,578, Cl. 324-158.00F.

Ohba, Toshihiro: *See*—
Inada, Shuji; Ohba, Toshihiro; Kishishita, Hiroshi; and Uede, Hisashi, 4,999,618, Cl. 340-781.000.

Ohmi, Atsushi: *See*—
Mizutani, Kenichiro; Tanaka, Seiya; and Ohmi, Atsushi, 4,998,607, Cl. 192-58.00B.

Ohnemus, Randall: *See*—
Kuracina, Thomas C.; and Ohnemus, Randall, 4,998,922, Cl. 604-192.000.

Ohno, Kenzo: *See*—
Yoshida, Yukio; and Ohno, Kenzo, 4,999,551, Cl. 318-286.000.

Ohsawa, Toshiyuki: *See*—
Kabata, Toshiyuki; Ohsawa, Toshiyuki; Yoneyama, Sachiko; and Kimura, Okitoshi, 4,999,263, Cl. 429-131.000.

Ohsawa, Yutaka: *See*—
Ueno, Fuminori; and Ohsawa, Yutaka, 4,999,661, Cl. 354-402.000.

Ohta, Masakatsu; Yabu, Shuichi; and Murakami, Junichi, to Canon Kabushiki Kaisha. Projection apparatus. 4,998,821, Cl. 353-122.000.

Ohtsuka, Nobuaki; Miyamoto, Junichi; and Atsumi, Shigeru, to Kabushiki Kaisha Toshiba. Nonvolatile semiconductor memory having a stress test circuit. 4,999,813, Cl. 365-201.000.

Ohya, Tetsuro: *See*—
Kuroda, Hirokazu; Nakai, Masaaki; Katoh, Takehiro; Ohya, Tetsuro; Izumi, Shuji; and Okuno, Akira, 4,999,665, Cl. 354-468.000.

Ojima, Fumio; Mashimo, Kiyokazu; Hozumi, Masahiko; Hoshizaki, Taketoshi; and Nakamura, Kazuyuki, to Fuji Xerox Co., Ltd. Function separated electrophotographic photoreceptor containing selenium. 4,999,268, Cl. 430-59.000.

Okada, Akinori: *See*—
Okumura, Fumio; Okada, Akinori; and Kondo, Kazuyoshi, 4,999,332, Cl. 503-209.000.

Okada, Shinji: *See*—
Fukushima, Tetsuo; Otsuki, Toshinori; Okada, Shinji; and Seutsugu, Kenichiro, 4,999,142, Cl. 264-1.700.

Okaji, Makoto: *See*—
Emoto, Kazuhiro; Haino, Kozo; Itoh, Akira; and Okaji, Makoto, 4,999,269, Cl. 430-58.000.

Okamoto, Kevin T., to General Electric Company. Branched polyester resin composition having enhanced melt viscosity. 4,999,388, Cl. 523-400.000.

Okamoto, Kiku; and Oki, Shigeo, to Oki, Shigeo. Method for controlling cockroaches. 4,999,201, Cl. 424-613.000.

Okamoto, Naoki: *See*—
Tateno, Yoshiaki; Yoneda, Susumu; Okamoto, Naoki; Ishii, Yoshibumi; and Kato, Kazuaki, 4,999,090, Cl. 203-36.000.

Okamoto, Tsuguhiko, to Kabushiki Kaisha Toshiba. Sensor for detecting two dimensional angle of incidence of the sun. 4,999,483, Cl. 250-203.100.

Okamura, Ryuji; Otoshi, Hirokazu; and Takei, Tetsuya, to Canon Kabushiki Kaisha. Process and apparatus for formation of functional deposited film on cylindrical substrate by means of microwave plasma chemical vapor deposition wherein said cylindrical substrate being maintained at desired temperature using thermally conductive gas. 4,999,214, Cl. 427-39.000.

Okazaki, Sakae: *See*—
Yamazaki, Hiroshi; and Okazaki, Sakae, 4,999,709, Cl. 358-160.000.

Oki Electric Industry Co., Ltd.: *See*—
Matsushiro, Nobuhito; and Oyake, Ikuo, 4,999,797, Cl. 364-720.000.

Oki, Shigeo: *See*—
Okamoto, Kiku; and Oki, Shigeo, 4,999,201, Cl. 424-613.000.

Oki, Toshikazu: *See*—
Toda, Soichiro; Hamagishi, Yasutaro; Oki, Toshikazu; and Tomita, Koji, 4,999,349, Cl. 514-183.000.

Okimoto, Satoshi; Fujikawa, Yukiharu; Otsuka, Naoki; and Sato, Miyuki, to Brother Kogyo Kabushiki Kaisha. Documentation system having page format function. 4,998,832, Cl. 400-76.000.

Okumura, Fumio; Okada, Akinori; and Kondo, Kazuyoshi, to Mitsubishi Paper Mills, Limited. Heat-sensitive recording material. 4,999,332, Cl. 503-209.000.

Okumura, Keiji; and Matsunobu, Kenichi, to Mita Industrial Co., Ltd. Sorter with jam-preventing members. 4,998,716, Cl. 271-297.000.

Okuno, Akira: *See*—
Kuroda, Hirokazu; Nakai, Masaaki; Katoh, Takehiro; Ohya, Tetsuro; Izumi, Shuji; and Okuno, Akira, 4,999,665, Cl. 354-468.000.

Okuno, Yoshihiro; and Kuramitsu, Yohichi, to Mitsubishi Denki Kabushiki Kaisha. Interconnection arrangement for a gate array. 4,999,698, Cl. 357-45.000.

Okunuki, Masahiko: *See*—
Watanabe, Nobuo; Tsukamoto, Takeo; Takeda, Toshihiko; Ono, Haruhito; and Okunuki, Masahiko, 4,999,083, Cl. 156-628.000.

Olbert, William H.: *See*—
Bainbridge, David W.; and Olbert, William H., 4,998,597, Cl. 181-243.000.

Olin Corporation: *See*—
Boudakian, Max M.; and Fidler, Delmer A., 4,999,434, Cl. 548-263.200.

Olinonen, Eero: *See*—
Palmu, Jukka; Olinonen, Eero; Numminen, Leo; Tolvanen, Jyrki; and Varis, Martti, 4,999,117, Cl. 210-744.000.

Olson, Robert V. Breakdown air mattress assembly. 4,998,310, Cl. 5-449.000.

Olympus Optical Co., Ltd.: *See*—
Aoki, Norihiko; Tsuchida, Hirofumi; and Ishii, Atsujirou, 4,999,007, Cl. 350-426.000.

Funakubo, Tomoki; Hakamatsuka, Yasuharu; Aihara, Mamoru; Watanabe, Kazuhiro; Koshiishi, Kiyozou; and Shigetomi, Sadao, 4,998,872, Cl. 425-143.000.
Hyakumura, Kazushi, 4,999,508, Cl. 250-560.000.
Nakamura, Hiroaki, 4,999,663, Cl. 354-415.000.
Uzawa, Tsutomu; Ishii, Atsujiro; and Aoki, Norihiko, 4,998,807, Cl. 350-423.000.
Wada, Yorio; and Hyakumura, Kazushi, 4,999,509, Cl. 250-560.000.

O'Malley, Gerard: *See—*
Kosley, Raymond W., Jr.; O'Malley, Gerard; and Spahl, Bettina, 4,999,351, Cl. 514-228.200.

Omni Medical Systems Inc.: *See—*
Doull, Hubert K., 4,998,623, Cl. 206-531.000.

Omron Corporation: *See—*
Azuma, Hiroshi; Takemura, Kenji; and Itoh, Kohji, 4,999,530, Cl. 310-12.000.

Omron Tateisi Electronics Co.: *See—*
Imamoto, Hiroshi, 4,999,844, Cl. 372-45.000.

Onan Corporation: *See—*
Jannesari, Michael J.; and Fabian, Alan N., 4,999,598, Cl. 335-122.000.

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Martin, Lawrence L.; Payack, Joseph F.; and Ong, Helen H., 4,999,358, Cl. 514-297.000.

Ono, Chiyoaki: *See—*
Chida, Shohei; Kozaki, Masami; Asahi, Toshinori; Ono, Chiyoaki; Iwasa, Seiji; Fukunaga, Taizou; and Takemura, Moriyuki, 4,998,776, Cl. 299-59.000.

Ono, Haruhito: *See—*
Watanabe, Nobuo; Tsukamoto, Takeo; Takeda, Toshihiko; Ono, Haruhito; and Okunuki, Masahiko, 4,999,083, Cl. 156-628.000.

Ono, Kouji: *See—*
Sato, Kiyoshi; and Ono, Kouji, 4,999,282, Cl. 430-569.000.

Onodera, Hiromi; Inaji, Toshio; Yoshiura, Tsukasa; Wakabayashi, Noriaki; Mitani, Hiroshi; and Tokura, Mitsuo, to Matsushita Electric Industrial Co., Ltd. Position control system. 4,999,558, Cl. 318-685.000.

Onuki, Jin: *See—*
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Opsal, Jon: *See—*
Gold, Nathan; Willenborg, David L.; Opsal, Jon; and Rosencwaig, Allan, 4,999,014, Cl. 356-382.000.

Oran, Michael R.: *See—*
Bowman, Bruce R.; Oran, Michael R.; and Syring, Gary J., 4,999,772, Cl. 364-413.050.

Orange Water and Sewer Authority: *See—*
Williamson, Ronald E., 4,999,111, Cl. 210-605.000.

Orino, Shoji; Tanaka, Hiroyosh; and Kuroda, Akiteru, to Toray Industries, Inc. Multi-layered conjugated acrylic fibers and the method for their production. 4,999,245, Cl. 428-374.000.

Orloski, John C. Vehicle control training device. 4,998,594, Cl. 180-198.000.

Ortho Pharmaceutical Corporation: *See—*
Ahmad, Nawaz; Ziets, George A.; and Das, Sudeb, 4,999,342, Cl. 514-54.000.

Orton, Michael V. Alignment and lateral support member for use in laying common concrete blocks. 4,998,397, Cl. 52-715.000.

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Miyamoto, Yoshinari; and Nakata, Hirohiko, 4,999,144, Cl. 264-56.000.

Osakabe, Nobuyuki; and Tonomura, Akira, to Hitachi, Ltd. Reflection electron holography apparatus. 4,998,788, Cl. 350-3.800.

Osato, Yoichi: *See—*
Saito, Ichiro; Osato, Yoichi; Fujii, Eiichi; and Arao, Kozo, 4,999,260, Cl. 428-694.000.

Osborne, James R.: *See—*
Seizert, Robert D.; and Osborne, James R., 4,998,639, Cl. 220-85.00F.

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Oshima, Zinichiro; Uchiyama, Kiyoshi; and Nanno, Ikuo, to Seiko Seiki Kabushik Kaisha. Transferring apparatus operated in a vacuum chamber. 4,998,859, Cl. 414-680.000.

Oshio, Minoru: *See—*
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,736, Cl. 361-321.000.
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,737, Cl. 361-321.000.
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,738, Cl. 361-321.000.
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Osterling, Lloyd A., to Scag Power Equipment, Inc. Lawn mower. 4,998,948, Cl. 56-12.600.

Ota, Naoki, to Kabushiki Kaisha Toshiba. Mail processing machine. 4,998,626, Cl. 209-584.000.

Otis Elevator Company: *See—*
Rivera, James A.; and Johnson, Gerald E., 4,998,613, Cl. 198-335.000.

Otoshi, Hirokazu: *See—*
Okamura, Ryuji; Otoshi, Hirokazu; and Takei, Tetsuya, 4,999,214, Cl. 427-39.000.

Ototani, Tohei; Degawa, Toru; Kusumoto, Kanichi; and Ebata, Makoto, to Mitsui Engineering and Ship Building Co., Ltd.; and Metal Research Corporation. Method of producing an iron-, cobalt- and nickel-base alloy having low contents of sulphur, oxygen and nitrogen. 4,999,053, Cl. 75-564.000.

Otsuka, Naoki: *See—*
Okimoto, Satoshi; Fujikawa, Yukiharu; Otsuka, Naoki; and Sato, Miyuki, 4,998,832, Cl. 400-76.000.

Otsuka Pharmaceutical Company, Limited: *See—*
Fujii, Setsuro; Kawamura, Hiroyuki; and Watanabe, Shinichi, 4,999,378, Cl. 514-567.000.

Otsuki, Toshinori: *See—*
Fukushima, Tetsuo; Otsuki, Toshinori; Okada, Shinji; and Seutsugu, Kenichiro, 4,999,142, Cl. 264-1.700.

Ott, Karl-Heinz: *See—*
Leitz, Edgar; Bottenbruch, Ludwig; Ott, Karl-Heinz; Jung, Alfred; and Grigo, Ulrich, 4,999,420, Cl. 528-371.000.

Ottenstein, Sidney A., to Innovative Controls, Incorporated. Ballast for high pressure sodium lamps having constant line and lamp wattage. 4,999,547, Cl. 315-307.000.

Otterburn, Michael S.: *See—*
Lengerich, Bernhard V.; Haynes, Lynn C.; Levine, Harry; Otterburn, Michael S.; Mathewson, Paul; and Finley, John, 4,999,208, Cl. 426-549.000.

Ousborne, Jeffrey J. Self service access controller. 4,999,763, Cl. 364-140.000.

Outboard Marine Corporation: *See—*
Bowers, William W.; Lieb, M. Jeremy; and Shockey, Robert J., 4,998,969, Cl. 123-187.50R.
Irwin, Gregory D.; and Franke, Norman C., 4,998,516, Cl. 123-198.00E.

Outside-In, Inc.: *See—*
Pritts, William V., 4,998,389, Cl. 52-90.000.

Oy E. Sarlin AB: *See—*
Palmu, Jukka; Olinonen, Eero; Numminen, Leo; Tolvanen, Jyrki; and Varis, Martti, 4,999,117, Cl. 210-744.000.

Oy Tampella AB: *See—*
Skytta, Osmo, 4,998,333, Cl. 29-130.000.

Oyake, Ikuo: *See—*
Matsushiro, Nobuhito; and Oyake, Ikuo, 4,999,797, Cl. 364-720.000.

Ozawa, Toshikazu: *See—*
Masuda, Tatsuyuki; and Ozawa, Toshikazu, 4,998,512, Cl. 123-65.0PE.

Ozimek, Robert E.: *See—*
Ewan, Frederick R., 4,998,666, Cl. 229-102.000.

Paesano, Agnese: *See—*
Brufani, Mario; Ceccarelli, Stefano; Giannetti, Patrizia; Paesano, Agnese; Scuri, Romolo; and Zanarella, Sergio, 4,999,350, Cl. 514-210.000.

Palitex Project Company GmbH: *See—*
Frentzel- Beyme, Johannes, 4,998,405, Cl. 57-279.000.

Palmer, Ralph P.: *See—*
Nixon, Duane B.; Palmer, Ralph P.; and Pritchett, Carl M., 4,998,760, Cl. 292-347.000.

Palmersten, Michael J. Interlocking panels. 4,998,396, Cl. 52-595.000.

Palmu, Jukka; Olinonen, Eero; Numminen, Leo; Tolvanen, Jyrki; and Varis, Martti, to Oy E. Sarlin AB. Monitoring method for wastewater pump station and compatible apparatus. 4,999,117, Cl. 210-744.000.

Palomar Importer & Wholesaler Co. Inc.: *See—*
Pan, Hsu C., 4,998,644, Cl. 221-24.000.

Pan, Hsu C., to Palomar Importer & Wholesaler Co. Inc. Toothpick dispenser. 4,998,644, Cl. 221-24.000.

Panster, Peter; Grethe, Horst; and Kleinschmit, Peter, to Degussa Aktiengesellschaft. Organosiloxane amine copolycondensates, method of their preparation and use (II). 4,999,413, Cl. 528-30.000.

Papathomas, Kostas I.: *See—*
Christie, Frederick R.; Papathomas, Kostas I.; and Wang, David W., 4,999,699, Cl. 357-65.000.

Papsdorf, John. Truss fabrication apparatus and method of making a truss. 4,998,336, Cl. 29-432.000.

Papst, Wilhelm: *See—*
Schetina, Otto; Kissich, Arnulf; Stecher, Werner; Habenicht, Helmut; Papst, Wilhelm; and Pleterski, Bernhard, 4,998,777, Cl. 299-67.000.

Paradies, Henrich H., to Medice Chem.-Pharm. Fabrik Putter GmbH & Co. KG. N-alkyl-6,7-dihydroxy benzimidazolium salts. 4,999,435, Cl. 248-326.000.

Paradise, Carolyn M.; and Bradley, Edward C., to Cetus Corporation. Combination therapy of IL-2 and DTIC for the treatment of melanoma. 4,999,339, Cl. 514-2.000.

Paravella, Luciano; and Figini, Luigi, to Snia Fibre SpA. Storage structure for textile bobbins. 4,998,857, Cl. 414-331.000.

Parham, William W.: *See—*
Krutak, James J.; Weaver, Max A.; Coates, Clarence A., Jr.; Hilbert, Samuel D.; Pruett, Wayne P.; and Parham, William W., 4,999,418, Cl. 528-272.000.

Parisen, Jon D.: *See—*
Eshler, Mark S.; Parisen, Jon D.; and Russell, Martin E., 4,998,780, Cl. 301-37.00S.

Park, Chin S.; and Castro, Herman A., to Intel Corporation. Exclusive-or cell for pattern matching employing floating gate devices. 4,999,525, Cl. 307-201.000.

Park Corporation: *See*—
Crowell, Terry M., 4,998,850, Cl. 406-48.000.

Park, Joon; Taketani, Stanley; Leung, Han C.; and Pelzman, George, to Hughes Aircraft Company. Printed wiring board fixture apparatus. 4,998,712, Cl. 269-25.000.

Parks, Robert A.; and White, Bradley E., to Boehringer Mannheim Corp. Biosensor electrode excitation circuit. 4,999,582, Cl. 324-438.000.

Parks, Robert A., to Boehringer Mannheim Corporation. Analog to digital conversion with noise reduction. 4,999,632, Cl. 341-167.000.

Parran, John J., Jr.; and Sakkab, Nabil Y., to Procter & Gamble Company, The. Oral compositions. 4,999,184, Cl. 424-52.000.

Parzygnat, William J.: *See*—
Bonanni, Rocco; Parzygnat, William J.; and Weiss, Roger E., 4,998,796, Cl. 350-96.210.

Pascal, Roger: *See*—
Dimier, Jean-Pierre; and Pascal, Roger, 4,998,747, Cl. 280-631.000.

Pasf Aktiengesellschaft: *See*—
Lueth, Gero; Becker, Rolf; Horn, Robert K.; Kempe, Uwe; and Vodrazka, Wolfgang, 4,999,029, Cl. 48-197.00R.

Paskonis, Alamantas K.: *See*—
Peterson, Francis C.; and Paskonis, Alamantas K., 4,998,759, Cl. 292-340.000.

Passien, Renold R. Combined vacuum and fluid line hose. 4,998,317, Cl. 15-321.000.

Paszkowski, Jerzy: *See*—
Shillito, Raymond D.; Paszkowski, Jerzy; and Potrykus, Ingo, 4,999,299, Cl. 435-240.470.

Paterson, Adrian W.: *See*—
Carr, Neil S.; and Paterson, Adrian W., 4,999,324, Cl. 501-107.000.

Pathold Investments, Co., Inc.: *See*—
Carr, Neil S.; and Paterson, Adrian W., 4,999,324, Cl. 501-107.000.

Patillon, Jean-Noel: *See*—
Gentner, Jean-Louis; Patillon, Jean-Noel; Mallet-Mouko, Catherine; and Martin, Gerard, 4,999,696, Cl. 357-30.000.

Paton, Boris E.; Voropai, Nikolai M.; Nikiforov, Boris A.; Schegolev, Georgy A.; Logiiko, Gennady P.; and Mischanin, Vasily G. Electrode wire. 4,999,479, Cl. 219-145.220.

Patton, Paul B.: *See*—
Anderson, Gregory W.; Landis, William R.; Patton, Paul B.; Schimbke, Paul A.; and Seidel, Michael J., 4,999,792, Cl. 364-550.000.

Patton, Robert T., to Dow Chemical Company, The. Viscosity-modifiers for aqueous-based dye-depletion products. 4,999,025, Cl. 8-111.000.

Patz, Werner: *See*—
Schreiter, Thomas; Reihl, Peter; Miklosi, Stefan; Reinsch, Burkhard; Wingen, Bernhard; Patz, Werner; and Furst, Arpad, 4,998,771, Cl. 296-217.000.

Paul, Gerhard: *See*—
Saupe, Thomas; Klebe, Gerhard; Schirmer, Ulrich; Paul, Gerhard; Kober, Reiner; Wuerzer, Bruno; Berghaus, Rainer; Meyer, Norbert; and Westphalen, Karl-Otto, 4,999,044, Cl. 71-92.000.

Paulin, Jacques, to U.S. Philips Corp. Digital method of modifying an image contrast so as to retain imaging of small objects. 4,999,711, Cl. 358-169.000.

Pauly, John M.: *See*—
Meyer, Craig H.; and Pauly, John M., 4,999,580, Cl. 324-309.000.

Paust, Joachim: *See*—
Dobler, Walter; Paust, Joachim; and Betz, Roland, 4,999,437, Cl. 549-222.000.
Dobuler, Walter; Schul, Wolfgang; Paust, Joachim; and Mitschker, Alfred, 4,999,112, Cl. 210-656.000.

Pavanel, Roberto, to Cazzaniga S.p.A. Butterfly valve with a sealing element of elastomeric material with an internal metal reinforcement. 4,998,708, Cl. 251-306.000.

Pavel Jordan & Associates: *See*—
Strong, Bernard, 4,998,570, Cl. 141-27.000.

Paxton, Donald B.; Lauritzen, Donald R.; and Anderson, Scott R., to Morton International, Inc. Two-stage automotive gas bag inflator using igniter material to delay second stage ignition. 4,998,751, Cl. 280-741.000.

Payack, Joseph F.: *See*—
Martin, Lawrence L.; Payack, Joseph F.; and Ong, Helen H., 4,999,358, Cl. 514-297.000.

Payne, Jewel; and Soares, George G., to Mycogen Corporation. Novel coleopteran-active *bacillus thuringiensis isolate*. 4,999,192, Cl. 424-93.000.

PDA Engineering: *See*—
Jechel, Kurt E.; and Schutzler, Jerome C., 4,999,246, Cl. 428-192.000.

Pearson, John. Apparatus for dispensing the contents of a tube. 4,998,645, Cl. 222-98.000.

Pedersen, Daniel E.: *See*—
Oakes, Thomas R.; Pedersen, Daniel E.; and Majewski, Donna M., 4,999,386, Cl. 523-122.000.

Peeters, Guido: *See*—
Vansant, Etienne; Peeters, Guido; de Bievre, Paul; and van Gompel, Remi, 4,999,175, Cl. 423-244.000.

Pelton, John F., to Union Carbide Industrial Gases Technology Corporation. Apparatus for holding and refining of molten aluminum. 4,998,710, Cl. 266-286.000.

Pelzman, George: *See*—
Park, Joon; Taketani, Stanley; Leung, Han C.; and Pelzman, George, 4,998,712, Cl. 269-25.000.

Pemberton, John H.; and Dear, Stephen L., to Swann-Morton Limited. Blade extractor. 4,998,334, Cl. 29-239.000.

Pennig, Dietmar. Foot supporting extension for external fixation units. 4,998,935, Cl. 606-54.000.

Pennsylvania Research Corporation, The: *See*—
Newnham, Robert E.; Xu, Qichang C.; and Yoshikawa, Shoko, 4,999,819, Cl. 367-157.000.

Pennsylvania State University, The: *See*—
Benkovic, Stephen J.; Blatchly, Richard A.; and Inglese, James, 4,999,424, Cl. 536-22.000.

Pennypacker, Frank C.: *See*—
Williamson, Lon A.; Pennypacker, Frank C.; Collier, Donald W.; and Fuller, Kip L., 4,999,613, Cl. 340-573.000.

Pennzoil Products Company: *See*—
Lockwood, Frances E.; Lazar, James G.; and Comer, Clarence M., 4,999,122, Cl. 252-32.500.

Pepin, Regis: *See*—
Gadras, Alain; and Pepin, Regis, 4,999,357, Cl. 514-277.000.

Perander, Michael; and Persson, Stellan. Display screen with reduced electrostatic field, method and means for making such screen. 4,999,261, Cl. 428-697.000.

Percutaneous Technologies Inc.: *See*—
Meyer, William F., 4,998,527, Cl. 128-6.000.

Perfetti, Patricia F.; and Cook, William R., to R. J. Reynolds Tobacco Company. Cigarette. 4,998,541, Cl. 131-336.000.

Perham, William J.; and Watlington, Daniel. Smoke generating device with rechargable cartridge. 4,998,479, Cl. 102-334.000.

Perkin-Elmer Corporation, The: *See*—
Rotolico, Anthony J.; Kushner, Burton A.; and Aly, Amr, 4,999,225, Cl. 427-423.000.

Perla, Dennis A.: *See*—
Bachynsky, Maria O.; Infeld, Martin H.; Margolis, Richard J.; and Perla, Dennis A., 4,999,375, Cl. 514-455.000.

Pernick, Benjamin J.: *See*—
Caputi, Stephen J.; Hobbs, Douglas S.; Pernick, Benjamin J.; Fonneland, Nils J.; and Fine, John V., Sr., 4,998,787, Cl. 350-3.730.

Perovetz, Lawrence M.; and Bhattacharya, Nagendra N., to Lamerie, N.V. Gold plating solutions, creams and baths. 4,999,054, Cl. 106-1.230.

Perry, William M., to Sheller-Globe Corporation. Exterior rearview mirror assembly. 4,998,814, Cl. 350-632.000.

Person, Mel N. Athletic training timer. 4,998,727, Cl. 273-55.00R.

Persson, Stellan: *See*—
Perander, Michael; and Persson, Stellan, 4,999,261, Cl. 428-697.000.

Peruch, Claudio: *See*—
Ferro, Francesco; and Peruch, Claudio, 4,998,404, Cl. 57-263.000.

Pesce, Gaetano, to Cassina S.p.A. Article of furniture made from thermosetting resin impregnated felt. 4,998,773, Cl. 297-446.000.

Pessis, Barbara A. Nail polish brush. 4,998,315, Cl. 15-160.000.

Peters, Anthony M.; and Sehorne, Mark A., to International Business Machines Corporation. Managing host to workstation file transfer. 4,999,766, Cl. 364-200.000.

Peterson, C. Lynn, to Peterson Filters Corporation. Method and apparatus for use in separating solids from liquids. 4,999,115, Cl. 210-728.000.

Peterson, Carl R.: *See*—
Lippka, Sandra M.; and Peterson, Carl R., 4,998,313, Cl. 14-71.100.

Peterson Filters Corporation: *See*—
Peterson, C. Lynn, 4,999,115, Cl. 210-728.000.

Peterson, Francis C.; and Paskonis, Alamantas K., to Buell Industries, Inc. Door striker assembly. 4,998,759, Cl. 292-340.000.

Peterson, Francis N. Traction mat. 4,998,670, Cl. 238-14.000.

Peterson, Myron L., to Schleicher Electronic GmbH & Co. KG. Fluid tiller apparatus. 4,999,057, Cl. 111-7.100.

Peterson, Randy J.: *See*—
Chernow, Fred; and Peterson, Randy J., 4,999,806, Cl. 364-900.000.

Peterson, Robert S.; and Larsen, John A., to AEG Westinghouse Industrial Automation Corporation. Method for rolling on-gauge head and tail ends of a workpiece. 4,998,427, Cl. 72-9.000.

Petit, Bernard, to Framatome; and Cogema. Demountable fuel assembly for a nuclear reactor cooled by light water. 4,999,154, Cl. 376-446.000.

Petro-Canada Inc.: *See*—
Jain, Anil K.; and Pruden, Barry B., 4,999,328, Cl. 502-151.000.

Peyronnenc, Michel: *See*—
Costes, Michel; Gach, Alain; Hartmann, Yves; and Peyronnenc, Michel, 4,999,769, Cl. 364-200.000.

Pfenning, Helmut: *See*—
Grimm, Erwin; Koch, Christian; Hausler, Volker; Pfenning, Helmut; and Christ, Hubert, 4,998,481, Cl. 104-166.000.

Phelps, Frederick G.: *See*—
Nelson, Gregory J.; and Phelps, Frederick G., 4,998,497, Cl. 114-230.000.

Philip Morris Incorporated: *See*—
Kailianos, Andrew G.; Lilly, A. Clifton, Jr.; Whidby, Jerry F.; and Dwyer, Rowland W., Jr., 4,998,542, Cl. 131-365.000.

Phototherapeutic Systems: *See*—
Lundahl, Scott L., 4,998,930, Cl. 606-15.000.

Picanol, N.V.: *See*—
Shaw, Henry, 4,998,567, Cl. 139-116.200.

Pichlik, Herbert, to U.S. Philips Corporation. High speed high resolution analog/digital converter circuit. 4,999,624, Cl. 341-118.000.

Pickard, Harold W. Line voltage monitor and controller. 4,999,730, Cl. 361-59.000.

Pieper, Thomas: *See—*
Schilling, Jurgen; Reichmann, Horst; Henche, Wolfgang; Pieper, Thomas; Braun, Bernd; and Ludowisy, Hans, 4,998,877, Cl. 431-19.000.

Pierce, Claudia C.; Grattan, David A.; and Fong, Dodd W., to Nalco Chemical Company. Modified polymers incorporating fatty amines. 4,999,161, Cl. 422-12.000.

Pilolla, Joseph J., to Sloan Valve Company. Spray head for automatic actuation. 4,998,673, Cl. 239-67.000.

Pin Dot Products: *See—*
Silverman, Michael W.; Heinrich, Michael; Brubaker, Clifford E.; and McLaurin, Colin A., 4,998,354, Cl. 33-514.200.

Pinto, Mark R.: *See—*
Luryi, Sergey; and Pinto, Mark R., 4,999,687, Cl. 357-16.000.

Pioneer Electric Corporation: *See—*
Senso, Hitoshi; and Takaki, Hisashi, 4,999,710, Cl. 358-160.000.

Pioneer Electronic Corporation: *See—*
Nohtomi, Nobuo; and Saito, Hideaki, 4,998,318, Cl. 16-121.000.
Shimatani, Shigeru, 4,999,745, Cl. 361-429.000.

Pipe Liners, Inc.: *See—*
Ledoux, Patrick R., 4,998,871, Cl. 425-140.000.

Pipkins, Alfred R. Pirn marker sheet and method for forming the same. 4,999,230, Cl. 428-43.000.

Pipkorn, David N.: *See—*
Katerberg, James A.; and Pipkorn, David N., 4,999,644, Cl. 346-1.100.

Pitney Bowes Inc.: *See—*
Baer, Patricia B.; Hunter, Kevin D.; Hart, William G.; Axelrod, Barry H.; and Sansone, Ronald P., 4,999,481, Cl. 235-375.000.

Pitrolo, Robert L.: *See—*
Moody, Lawrence G.; Childress, Thomas E.; Pitrolo, Robert L.; Ritscher, James S.; and Leichliter, Ronald P., 4,999,446, Cl. 556-470.000.

Planar Systems, Inc.: *See—*
Coovert, Richard E.; and King, Christopher N., 4,999,539, Cl. 313-505.000.

Platzer, Stephan J. W.; Yener, Mehmet U.; and Wanat, Stanley F., to Hoechst Celanese Corporation. Protected color image on substrate with thermal adhesive and antiblocking overlayers. 4,999,266, Cl. 430-14.000.

Plessers, Jacques J.; and Maes, Rudi, to Electro-Nite International N.V. Apparatus and method for measuring a gas content of liquid metal and probe used therein. 4,998,432, Cl. 73-19.070.

Pleterski, Bernhard: *See—*
Schetina, Otto; Kissich, Arnulf; Stecher, Werner; Habenicht, Helmut; Papst, Wilhelm; and Pleterski, Bernhard, 4,998,777, Cl. 299-67.000.

Plusa, Janusz: *See—*
Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; and Leclere, Jean, 4,998,322, Cl. 452-71.000.

Pohl, Christopher; Slingsby, Roseanne W.; Stillian, John R.; and Gajek, Ryszard, to Dionex Corporation. Modified membrane suppressor and method for use. 4,999,098, Cl. 204-301.000.

Polaroid Corporation: *See—*
Cowan, James J., 4,999,234, Cl. 428-156.000.

Polic, Marko: *See—*
Feichtiger, Dieter; Holzhauer, Horst; Kneib, Rudi; Polic, Marko; and Weikert, Gunther, 4,998,447, Cl. 74-502.600.

Polito, Betty Jean: *See—*
Maletsky, Albert; Nolan, Denis P.; and Polito, Betty Jean, 4,998,928, Cl. 604-365.000.

Pollen, Rudy W. J.; and Bierhoff, Martinus P. M., to U.S. Philips Corporation. Record carrier decoder for multi-track data patterns including error protection data. 4,999,828, Cl. 369-59.000.

Ponsinet, Gerard: *See—*
Comte, Marie-Therese; Gueremy, Claude; and Ponsinet, Gerard, 4,999,355, Cl. 514-253.000.

Poplett, James M.: *See—*
Dunaway, Thomas J.; Spielberger, Richard K.; and Poplett, James M., 4,999,700, Cl. 357-70.000.

Poppenheimer, Charles B., to GTY Industries. Niche mounted light fixture. 4,999,757, Cl. 362-287.000.

Porcellio, Rocco J.; and Zimmer, David I., to Eastman Kodak Company. Dual processor image compressor/expander. 4,999,715, Cl. 358-433.000.

Potrykus, Ingo: *See—*
Shillito, Raymond D.; Paszkowski, Jerzy; and Potrykus, Ingo, 4,999,299, Cl. 435-240.470.

Potthast, James W.; and Ring, Thomas J., to R & P Joint Venture. Hospital bed with guard rail actuated safety apparatus. 4,998,939, Cl. 5-424.000.

Potts, Rodney M.: *See—*
Etherington, Terence; Fletcher, Keith M.; Potts, Rodney M.; and Wade, John R., 4,999,271, Cl. 430-284.000.

Poulton, Barrie A., to Flomat Limited. Materials handling equipment. 4,998,991, Cl. 222-181.000.

Powr-Ups Corporation: *See—*
Summer, Steven E., 4,999,545, Cl. 315-219.000.

PPG Industries, Inc.: *See—*
Freeman, Glenn E.; Valimont, James L.; Dunaway, James H.; and Korenkiewicz, Karen J., 4,998,784, Cl. 350-3.700.

Pradel, Bernard J. Composite wine aging container. 4,998,643, Cl. 220-600.000.

Prazak, Charles J., III: *See—*
Adler, Robert; Fendley, James R.; Lange, Howard G.; Prazak, Charles J., III; Steiner, Johann; and Strauss, Paul, 4,998,901, Cl. 445-3.000.

Precht, Hans J.; Beumer, Klaus; and Scholz, Bernd, to Robert Krups Stiftung & Co. KG. Machine for brewing coffee and the like. 4,998,463, Cl. 99-300.000.

Preiss, Dieter; and Wilke, Harald. Puncture set for medical use. 4,998,977, Cl. 128-673.000.

Preseby, Harry J.: *See—*
Towne, Raymond A.; Snow, Robert T.; and Preseby, Harry J., 4,998,446, Cl. 74-473.00R.

Prestel, Helmut; and Muller, Klaus, to Ciba-Geigy Corporation. Process for the preparation of benzotriazole derivatives. 4,999,433, Cl. 548-260.000.

Prewo, Karl M.; Nardone, Vincent C.; and Strife, James R., to United Technologies Corporation. Microstructurally toughened metal matrix composite article. 4,999,256, Cl. 428-552.000.

Pribat, Didier; and Karapiperis, Leonidas, to Thomson-CSF. Method for making an alternation of layers of monocrystalline semiconducting material and layers of insulating material. 4,999,314, Cl. 437-89.000.

Prince Corporation: *See—*
Van Order, Kim L.; Wright, Kevin L.; and Smith, Nels R., 4,998,765, Cl. 296-97.110.

Prince, Lawrence S., to Hughes Aircraft Company. Multilayer cathode current collector/container for a battery. 4,999,262, Cl. 429-104.000.

Prins, Petrus D., to Goldfieds Engineering (Proprietary) Limited. Bogie steering system. 4,998,483, Cl. 105-3.000.

Pritchett, Carl M.: *See—*
Nixon, Duane B.; Palmer, Ralph P.; and Pritchett, Carl M., 4,998,760, Cl. 292-347.000.

Pritts, William V., to Outside-In, Inc. Variable pitch roof ridge beam assembly and components thereof. 4,998,389, Cl. 52-90.000.

Probst, Bernard; and Spector, George. Protective guard member. 4,999,233, Cl. 428-122.000.

Process Systems Inc.: *See—*
Kubacki, Lawrence G., 4,998,464, Cl. 99-455.000.

Procter & Gamble Company, The: *See—*
De Block, Franciscus; Marchesini, Maurizio; and Ceulemans, Raphael, 4,999,121, Cl. 252-8.800.
Parran, John J., Jr.; and Sakkab, Nabil Y., 4,999,184, Cl. 424-52.000.
Sabatelli, Anthony D.; and Spirnak, Josephine A., 4,999,186, Cl. 424-60.000.

Proform Fitness Products, Inc.: *See—*
Watterson, Scott R.; Standing, Donald J.; and Dalebout, William T., 4,998,725, Cl. 272-129.000.

Prometheus Energy Systems, B.V.: *See—*
Wiekmeijer, Theodorus, 4,998,408, Cl. 60-39.182.

Proni Creations Inc.: *See—*
Proni, Oscar, 4,998,831, Cl. 285-322.000.

Proni, Oscar, to Proni Creations Inc. Force concentrating unitary fitting. 4,998,831, Cl. 285-322.000.

Pruden, Barry B.: *See—*
Jain, Anil K.; and Pruden, Barry B., 4,999,328, Cl. 502-151.000.

Pruett, Wayne P.: *See—*
Krutak, James J.; Weaver, Max A.; Coates, Clarence A., Jr.; Hilbert, Samuel D.; Pruett, Wayne P.; and Parham, William W., 4,999,418, Cl. 528-272.000.

Prus, Eric: *See—*
Bordaz, Pascal; Giraud, Laurent; Monnier, Alain; and Prus, Eric, 4,998,672, Cl. 239-585.000.

Puchinger, Herwig; Gerken, Hero; and Kuhn, Gunther, to Eppendorf-Netheler-Hinz GmbH. Pipetting device comprising a retaining cone for holding a slip-on pipette tip and pipette tip for such pipetting device. 4,999,164, Cl. 422-100.000.

Puckett, Riley, to Pucketts Bloodtrailer Broadhead, Inc. Broadhead hunting arrow. 4,998,738, Cl. 273-421.000.

Pucketts Bloodtrailer Broadhead, Inc.: *See—*
Puckett, Riley, 4,998,738, Cl. 273-421.000.

Puget Sound Blood Center: *See—*
Slichter, Sherrill J.; and Deeg, H. Joachim, 4,998,931, Cl. 604-20.000.

Purcell, Alexander M., to Summagraphics Corporation. Position determining and digitizing method and device. 4,999,462, Cl. 178-19.000.

Purdie, Thomas. Mute for horn-type instruments. 4,998,959, Cl. 84-400.000.

Purdue Research Foundation, Division of Sponsored Programs: *See—*
Chen, Li Fu, 4,999,149, Cl. 264-187.000.

Puri, Atul, to AT&T Bell Laboratories. Three dimensional motion compensated video coding. 4,999,705, Cl. 358-136.000.

QED Environmental Systems, Inc.: *See—*
Newcomer, Kevin; and Richter, Steve, 4,998,585, Cl. 166-105.000.

Quist, William E.: *See—*
Curtis, R. Eugene; Narayanan, G. Hari; and Quist, William E., 4,999,061, Cl. 148-12.70A.

Quittmann, Wilhelm: *See—*
Bergmin, Renzo; Quittmann, Wilhelm; and Stoffel, Josef, 4,999,438, Cl. 549-329.000.

R. A. Jones & Co. Inc.: *See—*
Mohaupt, John M.; and Riemenschneider, Mark R., 4,998,910, Cl. 493-12.000.
Riemenschneider, Mark R.; and Ralidak, James P., 4,998,614, Cl. 198-463.400.

R & B Machine Tool Company: *See—*
Martin, M. Warren; and Weber, Lawrence H., 4,998,873, Cl. 425-541.000.

R. G. Hansen & Associates: *See—*
Hansen, Robert G., 4,998,848, Cl. 405-128.000.

R.G.S. Pattern Book Co. Limited: *See—*
Glover, Richard D., 4,998,882, Cl. 434-98.000.

R. J. Reynolds Tobacco Company: *See—*
Perfetti, Patricia F.; and Cook, William R., 4,998,541, Cl. 131-336.000.

R & P Joint Venture: *See—*
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Raab, Harald; Ament, Norbert; and Bernhard, Dieter, to Fichtel & Sachs AG. Clutch disk with delayed friction device. 4,998,608, Cl. 192-106.200.

Raasch, Hans, to W. Schlafhorst & Co. Silver can transport carriage. 4,998,406, Cl. 57-281.000.

Raaymakers, Wilhelmus P. M.; and Kuijpers, Franciscus L. J. M., to U.S. Philips Corporation. Recording/reading apparatus for inscribable record carrier and its manufacture. 4,999,825, Cl. 369-44.260.

Rademacher, Thomas W.: *See—*
Fleet, George W. J.; Rademacher, Thomas W.; and Dwek, Raymond A., 4,999,360, Cl. 514-315.000.

Ragin, John C., III: *See—*
Rose, Floyd D.; Ragin, John C., III; and Randall, Ronald H., Jr., 4,998,960, Cl. 84-622.000.

Ralidak, James P.: *See—*
Riemenschneider, Mark R.; and Ralidak, James P., 4,998,614, Cl. 198-463.400.

Ralph, John T.; Beckley, Guy B.; Brady, Frank T.; Jelenek, Ivan; Korn, Darryl K.; Meyer, John; Nay, Daniel L.; Searle, Colin M.; Shick, David; Williams, Richard W.; and Wilson, Jon C., deceased (by Wilson, Eva, executrix), to Control Data Corporation. Communications network. 4,999,771, Cl. 364-200.000.

Ralph, Stephen E.: *See—*
Capasso, Federico; and Ralph, Stephen E., 4,999,485, Cl. 250-213.00A.

Rampart Packaging Inc.: *See—*
Ofstein, David E., 4,999,254, Cl. 428-518.000.

Ramsauer, Dieter. Bar enclosure for sheet metal cabinet doors. 4,998,757, Cl. 292-39.000.

Ramsay, George, to AB Tetra Pak. Apparatus for the intermittent forward feeding of a material web provided with transverse crease lines. 4,998,657, Cl. 226-52.000.

Randall, Ronald H., Jr.: *See—*
Rose, Floyd D.; Ragin, John C., III; and Randall, Ronald H., Jr., 4,998,960, Cl. 84-622.000.

Ranford, Alan B., to Sherwood Medical Company. Double sleeve safety syringe. 4,998,924, Cl. 604-798.000.

Rank Taylor Hobson Inc.: *See—*
Youden, David H., 4,998,957, Cl. 82-117.000.

Ransburg Corporation: *See—*
Vogel, James C.; and Merritt, Christopher R., 4,998,501, Cl. 118-312.000.

Rapoport, Uri. Permanent magnet arrangement. 4,998,976, Cl. 128-653.0SC.

Rasmussen, Thorkild H., to Densit A/S Rordalsuej. Method and a composition for preparing a shaped article. 4,999,056, Cl. 106-737.000.

Rau, Roland, to Deutsche Sporflex GmbH. Support for the ankle joint area. 4,998,537, Cl. 128-80.00H.

Rausing, Hans, to Tetra Pak International AB. Pack for liquids. 4,998,668, Cl. 229-123.100.

Rawald, Kenneth E., to Masco Building Products Corp. Decorative hardware mounting system. 4,998,701, Cl. 248-224.300.

Ray, Patricia G.: *See—*
Smith, Michael G.; Renga, James M.; Riley, Brian K.; Ray, Patricia G.; and Marlowe, Charles, 4,999,448, Cl. 558-411.000.

Raychem Corporation: *See—*
Gronvall, Daniel, 4,998,894, Cl. 439-521.000.

Raychem Limited: *See—*
Towle, Ian D. H.; and Horner, Patrick J., 4,999,411, Cl. 528-9.000.

Rayovac Corporation: *See—*
Dopp, Robert B., 4,999,265, Cl. 429-198.000.

Raytheon Company: *See—*
Dudley, Kenneth W.; Edgar, Richard H.; and Eves, E. Eugene, II, 4,999,469, Cl. 219-10.55A.

RCA Licensing Corporation: *See—*
Wilber, James A., 4,999,549, Cl. 315-387.000.

Read Corporation, The: *See—*
Read, James L., 4,998,625, Cl. 209-234.000.

Read, James L., to Read Corporation, The. Riprap separation apparatus and method. 4,998,625, Cl. 209-234.000.

Reagle, Charles D.: *See—*
Albritton, Charles W.; and Reagle, Charles D., 4,999,037, Cl. 55-385.100.

Rechenbach, William S., to General Motors Corporation. Method of cleaning stamping dies. 4,998,428, Cl. 72-40.000.

Redford, Kenneth M.: *See—*
Williams, Anthony B.; Redford, Kenneth M.; Mitchell, Scott; and Bussell, Richard N., 4,999,524, Cl. 307-54.000.

Rediker, Robert H.: *See—*
Goodhue, William D.; Rediker, Robert H.; and Bossi, Donald E., 4,999,316, Cl. 437-129.000.

Reed, Herb. Artificial fishing lure. 4,998,372, Cl. 43-42.240.

Reeder, Gary M. Sprinkler pivot joint. 4,998,755, Cl. 285-181.000.

Reeves, Robert H., Jr.; Cox, Charles R.; and Montes, Hilario, to Velasco Scale Company. Lid alignment and fixing apparatus. 4,998,911, Cl. 493-108.000.

Regina, Anne C.: *See—*
Norman, Edward C.; and Regina, Anne C., 4,999,119, Cl. 252-3.000.

Regnier, Gilbert; Dhainaut, Alain; Vilaine, Jean-Paul; Villeneuve, Nicole; Joly, Ghislaine; and Duhault, Jacques, to ADIR et Compagnie. New aminochromanol compounds. 4,999,372, Cl. 514-422.000.

Rehmer, Gerd; Schwartz, Manfred; and Dotzauer, Bernhard, to BASF Aktiengesellschaft. Prevention of efflorescence phenomena on mineral substrates. 4,999,218, Cl. 427-54.100.

Rei, Mark W.: *See—*
Nix, Richard A.; Branum, Leslie P.; Rei, Mark W.; and Schwartz, Michael L., 4,998,609, Cl. 192-109.00F.

Reichmann, Horst: *See—*
Schilling, Jurgen; Reichmann, Horst; Henche, Wolfgang; Pieper, Thomas; Braun, Bernd; and Ludowisy, Hans, 4,998,877, Cl. 431-19.000.

Reick, Franklin G., to Ebert, Michael. High-temperature porous-ceramic superconductors. 4,999,322, Cl. 501-83.000.

Reid, Austin H., Jr.: *See—*
Holtzen, Dwight A.; and Reid, Austin H., Jr., 4,999,055, Cl. 106-436.000.

Reifenberg, Gerald H.: *See—*
Bohen, Joseph M.; Reifenberg, Gerald H.; and Stein, Daryl L., 4,999,391, Cl. 524-94.000.

Reihl, Peter: *See—*
Schreiter, Thomas; Reihl, Peter; Miklosi, Stefan; Reinsch, Burkhard; Wingen, Bernhard; Patz, Werner; and Furst, Arpad, 4,998,771, Cl. 296-217.000.

Reinecke, Paul: *See—*
Holmwood, Graham; Kraatz, Udo; Buchel, Karl H.; Brandes, Wilhelm; Dutzmann, Stefan; and Reinecke, Paul, 4,999,440, Cl. 549-556.000.

Reinholtz, Charles F., to Milliken Research Corporation. Snubber profile. 4,998,942, Cl. 28-245.000.

Reinsch, Burkhard: *See—*
Schreiter, Thomas; Reihl, Peter; Miklosi, Stefan; Reinsch, Burkhard; Wingen, Bernhard; Patz, Werner; and Furst, Arpad, 4,998,771, Cl. 296-217.000.

Reiser, Hans J.: *See—*
Accati, Silla F.; and Reiser, Hans J., 4,999,166, Cl. 422-131.000.

Reissmann, Ulrich. Device for unloading containers. 4,999,021, Cl. 474-415.000.

Reitz, Paul R.: *See—*
Bowen, Terry P.; Reitz, Paul R.; and Long, William K., 4,998,795, Cl. 350-96.200.

Rempfler, Hermann, to Ciba-Geigy Corporation. N-(2-nitrophenyl)-N-pyrimidin-2-ylureas. 4,999,046, Cl. 71-92.000.

Renga, James M.: *See—*
Smith, Michael G.; Renga, James M.; Riley, Brian K.; Ray, Patricia G.; and Marlowe, Charles, 4,999,448, Cl. 558-411.000.

Renk Aktiengesellschaft: *See—*
Zaunberger, Franz-Xaver, 4,998,591, Cl. 180-6.440.

Research Association for Pulp and Paper Technology: *See—*
Ebihara, Masafumi; Akitomo, Takeshi; and Nomura, Minoru, 4,999,087, Cl. 162-301.000.

Resopal GmbH: *See—*
Klimke, Peter; and Neubert, Paul, 4,998,306, Cl. 4-619.000.

Restaino, Alfred J., to Creative Assets and Consulting Corporation. Polyimide resins from bis-imide, monomer having two methylene groups activated by adjacent carbonyls, and polyamine. 4,999,419, Cl. 528-322.000.

Reuter, Wolfgang; Debus, Jurgen; and Lehr, Lothar, to Rittal-Werk Rudolf Loh GmbH & Co. KG. Suspension apparatus for control device. 4,998,702, Cl. 248-278.000.

Reynolds Aluminium Holland B.V.: *See—*
Tiekink, Jozef J., 4,998,337, Cl. 29-527.400.

Reynolds, Frank E.: *See—*
Reynolds, Philip A.; and Reynolds, Frank E., 4,998,813, Cl. 350-624.000.

Reynolds, Frank S.; and Ricci, Louis W., to International Business Machines Corporation. Programmable channel error injection. 4,999,837, Cl. 371-3.000.

Reynolds, Philip A.; and Reynolds, Frank E. Mirror system for passenger buses. 4,998,813, Cl. 350-624.000.

Rhee, Chuen J.: *See—*
Vilims, Daniel E., 4,998,363, Cl. 40-156.000.

Rhone-Poulenc: *See—*
Comte, Marie-Therese; Gueremy, Claude; and Ponsinet, Gerard, 4,999,355, Cl. 514-253.000.

Rhone-Poulenc Agrochimie: *See—*
Gadras, Alain; and Pepin, Regis, 4,999,357, Cl. 514-277.000.

Rhone-Poulenc Chimie: *See—*
Baumard, Jean-Francois; Dubois, Bertrand; and Odier, Philippe, 4,999,182, Cl. 423-608.000.
Iltis, Alain; and Maestro, Patrick, 4,999,176, Cl. 423-289.000.
Schuppiser, Jean-Luc, 4,999,047, Cl. 71-94.000.

Rhone-Poulenc Specialties Chimiques: *See—*
Gourlaouen, Claire; Magnier, Claude; Latourrette, Bertrand; Tugaye, Anne; and Deneuve, Francoise, 4,999,180, Cl. 423-592.000.

Rhymer, Bill R.; and Rouquart, Luc, to Rhymer Company, The. Automatic wax lubricator for flatwork ironer. 4,998,359, Cl. 38-14.000.

Rhymer Company, The: *See*—
Rhymer, Bill R.; and Rouquart, Luc, 4,998,359, Cl. 38-14.000.
Ricci, Louis W.: *See*—
Reynolds, Frank S.; and Ricci, Louis W., 4,999,837, Cl. 371-3.000.
Rice, Owen, Jr.; and Joblonicky, Bruce A., to Lex Systems Southeast. Computer control of photocopiers. 4,999,672, Cl. 355-202.000.
Richardson, Peter J.; and Tury, Bernard, to Imperial Chemical Industries plc. Composition and use. 4,999,250, Cl. 428-457.000.
Richaud, Michel J. Mechanism for driving a plurality of objects along relative reciprocating paths alternatingly in the same direction and in an opposite direction. 4,998,366, Cl. 40-547.000.
Richlin, Milton; and Dubeck, Aloysius. Wig stand with ventilation channels. 4,998,992, Cl. 223-66.000.
Richter, Simon J.; and Cobb, Alva C., to Coca-Cola Company, The. Collapsible bag with evacuation passageway and method for making the same. 4,998,990, Cl. 222-92.000.
Richter, Steve: *See*—
Newcomer, Kevin; and Richter, Steve, 4,998,585, Cl. 166-105.000.
Ricoh Company, Ltd.: *See*—
Kabata, Toshiyuki; Ohsawa, Toshiyuki; Yoneyama, Sachiko; and Kimura, Okitoshi, 4,999,263, Cl. 429-131.000.
Kaneko, Yutaka, 4,999,484, Cl. 250-208.100.
Maruo, Fumitaka; and Hosoya, Akira, 4,999,654, Cl. 346-160.000.
Nakamura, Seiji, 4,999,716, Cl. 358-434.000.
Ridout, Graham T. Decorative surface and a method of producing it. 4,998,785, Cl. 350-3.700.
Riemenschneider, Mark R.; and Ralidak, James P., to R. A. Jones & Co. Inc. Conveyor discharge control. 4,998,614, Cl. 198-463.400.
Riemenschneider, Mark R.: *See*—
Mohaupt, John M.; and Riemenschneider, Mark R., 4,998,910, Cl. 493-12.000.
Rieter Machine Works, Ltd.: *See*—
Staheli, Paul; and Verzilli, Giuseppe, 4,998,325, Cl. 19-106.00R.
Riggle, Thomas W.: *See*—
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Riley, Brian K.: *See*—
Smith, Michael G.; Renga, James M.; Riley, Brian K.; Ray, Patricia G.; and Marlowe, Charles, 4,999,448, Cl. 558-411.000.
Ring, Thomas J.: *See*—
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Rischen, Dietmar: *See*—
Kehl, Georg; Siegel Heinz; Deringer, Helmut; Rischen, Dietmar; Abbing, Andreas; and Bullinger, Alfred, 4,998,781, Cl. 303-10.000.
Ristic, Ljubisa; Baltes, Heinrich P.; and Smy, Thomas, to University of Alberta, The Governors of the. Semiconductor magnetic field sensor. 4,999,692, Cl. 357-27.000.
Ritscher, James S.: *See*—
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Rittal-Werk Rudolf Loh GmbH & Co. KG: *See*—
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Rivera, James A.; and Johnson, Gerald E., to Otis Elevator Company. Self adjustable escalator handrail drive. 4,998,613, Cl. 198-335.000.
Robert Bosch GmbH: *See*—
Geyer, Gerhard; Mendle, Johann; and Dillmann, Hermann-Josef, 4,998,523, Cl. 123-502.000.
Kuehn, Willi, 4,999,566, Cl. 323-222.000.
Robert Krups Stiftung & Co. KG.: *See*—
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Roberts, Bradley M.; and Birke, James L., to Gemcor Engineering Corporation. Method of inserting fasteners. 4,998,943, Cl. 29-432.200.
Roberts, Daniel L.; and Willard, G. Fred, to General Electric Company. Foamed blends of nylon 6,I/T and polycarbonate. 4,999,384, Cl. 521-134.000.
Roberts, Robert E.; and Caudle, Wayne E., to Bry-Air, Inc. Integrally valved, low friction indexing desiccant bed dehumidifier. 4,999,033, Cl. 55-181.000.
Roberts, William P.: *See*—
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Robertson, Steven, to Miles Inc. Dynamic braking centrifuge. 4,999,304, Cl. 436-45.000.
Robinson, Duane S.: *See*—
Londt, Edward E.; and Robinson, Duane S., 4,998,592, Cl. 180-89.120.
Robinson, Phillip J.: *See*—
Jones, Winton D.; Dage, Richard C.; Claxton, George P.; Cheng, Hsien C.; and Robinson, Phillip J., 4,999,431, Cl. 546-168.000.
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Rockwell International Corporation: *See*—
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Tellier, Gilbert F., 4,998,740, Cl. 277-205.000.
Woodcock, Robert R., 4,998,689, Cl. 244-46.000.
Rodder, Mark S., to Texas Instruments Incorporated. Transistor. 4,999,690, Cl. 357-23.700.
Rodi, Anton; Hauck, Dieter; Lehnert, Michael; and Jurkewitz, Manfred, to Heidelberger Druckmaschinen AG. Device for controlling a printing machine. 4,998,472, Cl. 101-216.000.
Rogers, Jack; and Sweet, James. Electric lamp with multiple power connectors. 4,999,752, Cl. 362-228.000.
Rogers, Ronald J., to Vacu-Purg, Inc. Food pasteurization system vacuum breaker. 4,998,554, Cl. 137-217.000.
Rognon, Armand. Cooling system for air cooled internal combustion engines. 4,998,510, Cl. 123-41.700.
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Dighe, Shyam V.; Taylor, Raymond F., Jr.; Steffen, Robert J.; and Rohaus, David M., 4,998,486, Cl. 110-346.000.
Rohde, Wolfgang: *See*—
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Rohm Co., Ltd.: *See*—
Sakiyama, Hajime; Tanaka, Haruo; and Mushiage, Masato, 4,999,841, Cl. 372-45.000.
Rohr Industries, Inc.: *See*—
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Rolls-Royce Motor Cars Limited: *See*—
Wilkin, Clive J., 4,998,953, Cl. 70-452.000.
Rolls-Royce Plc: *See*—
Cantwell, Hugh F., 4,998,949, Cl. 60-39.161.
Ropars, Henri: *See*—
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Rose, Floyd: *See*—
Rose, Floyd D.; Ragin, John C., III; and Randall, Ronald H., Jr., 4,998,960, Cl. 84-622.000.
Rose, Floyd D.; Ragin, John C., III; and Randall, Ronald H., Jr., to Rose, Floyd. Music synthesizer. 4,998,960, Cl. 84-622.000.
Rose, Howard W., to AMP Incorporated. Electrical connector end cap. 4,998,897, Cl. 439-629.000.
Rosemann, Michael: *See*—
Goebbels, Hans R.; Biermann, Kurt; Steppat, Gerhard; Stapel, Wilhelm; Rosemann, Michael; and Seiler, Klaus D., 4,998,490, Cl. 112-231.000.
Rosen, Arye; and Rosen, Har'el, to AMT Inc. Catheter with distally located integrated circuit radiation generator. 4,998,932, Cl. 606-29.000.
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Rosen, Arye; and Rosen, Har'el, 4,998,932, Cl. 606-29.000.
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Rosendahl, Maschinen Gesellschaft m.b.H.: *See*—
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Rosenquist, Niles R., to General Electric Company. Method of cross-linking resin with carboxyl polycarbonate. 4,999,408, Cl. 525-463.000.
Ross, E. Richard, to Roll-A-Bot, Inc. Gravity-operated bottle and can dispensing rack. 4,998,628, Cl. 211-59.200.
Rothon, Roger N.; Ryan, Thomas A.; and Tavener, Phillip J., to Imperial Chemical Industries PLC. Filled cohesive polymer matrices and process for producing same. 4,999,387, Cl. 523-205.000.
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Tomimatsu, Shigenao, 4,998,414, Cl. 62-259.300.
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Sankey, James K., to Alpha Enterprises, Inc. Method of utilizing a videocassette identifying storage and display sleeve. 4,998,985, Cl. 206-387.000.
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Schultz, Jean-Pierre; Soler, Jean; and Nicoud, Daniel, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Gas mixture and welding method. 4,999,474, Cl. 219-74.000.

Schumann, Robert W. Computer graphics color film recording method and apparatus. 4,999,791, Cl. 364-525.000.

Schuppiser, Jean-Luc, to Rhone-Poulenc Chimie. Xanthan gum/cationic compound aqueous concentrates. 4,999,047, Cl. 71-94.000.

Schussler, Robert; and Acker, Bernd, to Daimler-Benz AG. Active suspension system. 4,999,777, Cl. 364-424.050.

Schutzler, Jerome C.: *See*—
Jechel, Kurt E.; and Schutzler, Jerome C., 4,999,246, Cl. 428-192.000.

Schwark, Peter: *See*—
Lawler, Adrian; Schwark, Peter; and Moore, Joe, 4,998,370, Cl. 43-42.060.

Schwartz, Josephine M. Organized storage for miscellaneous parts. 4,998,630, Cl. 211-71.000.

Schwartz, Manfred: *See*—
Rehmer, Gerd; Schwartz, Manfred; and Dotzauer, Bernhard, 4,999,218, Cl. 427-54.100.

Schwartz, Michael L.: *See*—
Nix, Richard A.; Branum, Leslie P.; Rei, Mark W.; and Schwartz, Michael L., 4,998,609, Cl. 192-109.00F.

Schwarz, Walter: *See*—
Babel, Werner; and Schwarz, Walter, 4,998,852, Cl. 409-144.000.

Scientific Generics Limited: *See*—
Crossfield, Michael D., 4,999,609, Cl. 340-551.000.

SCM Metal Products, Inc.: *See*—
Nadkarni, Anil; Samal, Prasan K.; and Synk, James E., 4,999,336, Cl. 505-1.000.

Scott, James W. Isotonic exercising apparatus. 4,998,722, Cl. 272-96.000.

Scott Motors, Inc.: *See*—
Masters, Stephen C., 4,999,556, Cl. 318-599.000.

Scotten, Jeffrey D.: *See*—
Meyer, Robert G.; and Scotten, Jeffrey D., 4,999,586, Cl. 330-288.000.

Scotti, Alessandro: *See*—
Cavagnolo, Gian P.; and Scotti, Alessandro, 4,999,759, Cl. 363-21.000.

Scozzafava, Michael: *See*—
Schildkraut, Jay S.; Young, Ralph H.; Williams, David J.; and Scozzafava, Michael, 4,999,809, Cl. 365-106.000.

Scripnick, Mark. Venturi line operated soap brush. 4,998,836, Cl. 401-42.000.

Scuri, Romolo: *See*—
Brufani, Mario; Ceccarelli, Stefano; Giannetti, Patrizia; Paesano, Agnese; Scuri, Romolo; and Zanarella, Sergio, 4,999,350, Cl. 514-210.000.

Sea Containers Ltd: *See*—
Nessfield, Stanley, 4,998,634, Cl. 220-1.500.

Seagate Technology, Inc.: *See*—
Jacobs, William G., 4,998,987, Cl. 209-552.000.

Searle, Colin M.: *See*—
Ralph, John T.; Beckley, Guy B.; Brady, Frank T.; Jelenek, Ivan; Korn, Darryl K.; Meyer, John; Nay, Daniel L.; Searle, Colin M.; Shick, David; Williams, Richard W.; and Wilson, Jon C., deceased, 4,999,771, Cl. 364-200.000.

SECAP: *See*—
Martin, Claude; and Chevillon, Francis, 4,999,616, Cl. 340-674.000.

Seemuth, Paul D., to Du Pont de Nemours, E. I., and Company. Aqueous emulsion finish for spandex fiber treatment comprising a polydimethyl siloxane and an ethoxylated long-chained alkanol. 4,999,120, Cl. 252-8.600.

Sehorne, Mark A.: *See*—
Peters, Anthony M.; and Sehorne, Mark A., 4,999,766, Cl. 364-200.000.

Seibert, Gerhard, to Rosendahl, Maschinen Gesellschaft m.b.H. Means for core coating. 4,998,870, Cl. 425-113.000.

Seicon Co., Ltd.: *See*—
Nagatomo, Toshihiro, 4,998,324, Cl. 452-149.000.

Seidel, Jurgen; and Rohde, Wolfgang, to SMS Schloemann-Siemag Aktiengesellschaft. Method and arrangement for manufacturing hot-rolled steel strip. 4,998,338, Cl. 29-527.600.

Seidel, Michael J.: *See*—
Anderson, Gregory W.; Landis, William R.; Patton, Paul B.; Schimbke, Paul A.; and Seidel, Michael J., 4,999,792, Cl. 364-550.000.

Seiko Instruments & Electronics Ltd.: *See*—
Kamamori, Hitoshi; Iwasa, Koji; Suginoya, Mitsuru; Sano, Yutaka; Terada, Yumiko; and Kato, Naoki, 4,999,094, Cl. 204-180.200.

Seiko Instruments Inc.: *See*—
Miyata, Chikara; Yasutake, Masatoshi; and Ishijima, Hiroshi, 4,999,495, Cl. 250-306.000.
Nakagawa, Yoshitomo, 4,999,492, Cl. 250-281.000.

Seiko Seiki Kabushik Kaisha: *See*—
Oshima, Zinichiro; Uchiyama, Kiyoshi; and Nanno, Ikuo, 4,998,859, Cl. 414-680.000.

Seiler, Klaus D.: *See*—
Goebbels, Hans R.; Biermann, Kurt; Steppat, Gerhard; Stapel, Wilhelm; Rosemann, Michael; and Seiler, Klaus D., 4,998,490, Cl. 112-231.000.

Seio, Mamoru; Nishijima, Kanji; and Ishikawa, Katsukiyo, to Nippon Paint Co., Ltd. Positive type photosensitive resinous composition with 1,2 quinone diazide sulfonyl unit. 4,999,274, Cl. 430-190.000.

Seipelt, Christopher, to United States of America, Air Force. Torque motor driver. 4,999,552, Cl. 318-434.000.

Seitz, Hugo K.: *See*—
Beha, Johannes G.; Blacha, Armin U.; Clauberg, Rolf; and Seitz, Hugo K., 4,999,577, Cl. 324-158.00R.

Seizert, Robert D.; and Osborne, James R., to Solvay Automotive, Inc. Fuel sender locking ring. 4,998,639, Cl. 220-85.00F.

Seki, Masaki; Samukawa, Koji; and Hanaoka, Osamu, to Fanuc Ltd. Method of creating NC data for grooving. 4,999,765, Cl. 364-191.000.

Sekiguchi, Ryoichi, to Sanden Corporation. Beverage extracting apparatus for vending machines. 4,998,462, Cl. 99-289.00T.

Selder, Harald: *See*—
Lang, Heinrich; and Selder, Harald, 4,999,084, Cl. 162-4.000.

Select Service & Supply Co., Inc.: *See*—
Traub, Barry H., 4,998,728, Cl. 273-65.0EB.

Selker, Harry P.; Wagner, Galen S.; Weaver, W. Douglas; and Califf, Robert M., to New England Medical Center Hospitals, Univ. of Washington, Inc.; and Duke University. Thrombolysis predictive instrument. 4,998,535, Cl. 128-696.000.

Semiconductor Energy Laboratory Co., Ltd.: *See*—
Yamazaki, Shunpei, 4,999,270, Cl. 430-67.000.
Yamazaki, Shunpei; Mase, Akira; and Hamatani, Toshiji, 4,999,693, Cl. 357-30.000.

Semler, Gerd; and Wilhelm, Gerd, to Bodenseewerk Geratetchnik GmbH. Optical seeker with rosette scanning. 4,999,491, Cl. 250-236.000.

Sen, Susanta: *See*—
Capasso, Federico; Cho, Alfred Y.; and Sen, Susanta, 4,999,697, Cl. 357-34.000.

Sengstaken, David. Visual display and amusement device. 4,998,364, Cl. 40-411.000.

Sens, Ruediger: *See*—
Albert, Bernhard; Etzbach, Karl-Heinz; and Sens, Ruediger, 4,999,026, Cl. 8-471.000.

Senso, Hitoshi; and Takaki, Hisashi, to Pioneer Electric Corporation. Television signal receiving apparatus. 4,999,710, Cl. 358-160.000.

Sequeira, Joel A.: *See*—
Kogan, Patricia W.; Rudnic, Edward M.; Sequeira, Joel A.; and Chaudry, Imtiaz A., 4,999,189, Cl. 424-79.000.

Seraji, Homayoun, to United States of America, National Aeronautics and Space Administration. Method and apparatus for configuration control of redundant robots. 4,999,553, Cl. 318-561.000.

Seuberling, Frank: *See*—
Wilson, Rosser S.; and Seuberling, Frank, 4,999,720, Cl. 360-48.000.

Seutsugu, Kenichiro: *See*—
Fukushima, Tetsuo; Otsuki, Toshinori; Okada, Shinji; and Seutsugu, Kenichiro, 4,999,142, Cl. 264-1.700.

SGS-Thomson Microelectronics, Inc.: *See*—
Link, Joseph; Bolan, Michael L.; Brunk, Allen H., Jr.; and Schneikart, Paul E., 4,998,888, Cl. 439-73.000.

Shani, Yosi: *See*—
Henry, Charles H.; Kazarinov, Rudolf F.; and Shani, Yosi, 4,998,793, Cl. 350-96.150.

Shantz, Steven M.: *See*—
deCastro, Aurora F.; Gupta, Surendra K.; and Shantz, Steven M., 4,999,288, Cl. 435-18.000.

Sharaby, Zaev, to B. F. Goodrich Company, The. Reactive polyvinyl chloride and polymer products made therefrom. 4,999,406, Cl. 525-386.000.

Sharifzadeh, Saeed. Bidet and toilet bowl cleaner device. 4,998,300, Cl. 4-420.400.

Sharp Kabushiki Kaisha: *See*—
Akagi, Yoshiro; Ishino, Mariko; Inoue, Atsuhisa; Kaminishi, Shigeru; and Taniguchi, Hiroshi, 4,999,215, Cl. 427-41.000.
Fuji, Hiroshi; Maeda, Shigemi; Sakamoto, Noriaki; Terashima, Shigeo; Yamaguchi, Takeshi; Tsuji, Kentaro; and Kojima, Kunio, 4,999,824, Cl. 369-13.000.
Horiuchi, Kenji, 4,998,804, Cl. 350-334.000.
Iguchi, Katsuji; Urai, Masahiko; and Masuichi, Chiyako, 4,999,689, Cl. 357-23.600.
Inada, Shuji; Ohba, Toshihiro; Kishishita, Hiroshi; and Uede, Hisashi, 4,999,618, Cl. 340-781.000.
Katsuta, Yuji, 4,999,629, Cl. 341-155.000.
Sano, Masanori; Ueyama, Masanori; and Watanabe, Kenji, 4,999,543, Cl. 315-169.300.
Tsuji, Shigeki; Kurata, Yukio; and Yokota, Taizo, 4,998,806, Cl. 350-413.000.
Uemura, Susumu; Tomino, Tadashi; Tsujioka, Hiroshi; Yoneda, Shigeo; Shindoh, Shigeru; and Yatsuzuka, Yasuhumi, 4,999,617, Cl. 340-706.000.
Ueno, Atsushi; and Suzuki, Takao, 4,999,713, Cl. 358-225.000.
Yakushiji, Akira, 4,999,794, Cl. 364-707.000.

Sharp, Peggy. Detachable dispenser and hanging support. 4,998,647, Cl. 222-143.000.

Shaw, David A.; and Herriot, Glen A., to Nanoquest (Canada) Inc. Magnification compensation apparatus. 4,999,496, Cl. 250-310.000.

Shaw, Henry, to Picanol, N.V. Weft thread break detector with a time delay circuit. 4,998,567, Cl. 139-116.200.

Shaw, Herbert R., III. Shroud for marine propulsion system. 4,998,496, Cl. 114-222.000.

Shell Oil Company: *See—*
Smutny, Edgar J., 4,999,399, Cl. 525-185.000.

Sheller-Globe Corporation: *See—*
Perry, William M., 4,998,814, Cl. 350-632.000.

Shepard, Michael L., to Westvaco Corporation. Acoustic wave guide. 4,998,439, Cl. 73-592.000.

Shepard, Vance R., Jr.; and Wolf, Michelle, to Duracell Inc. Aqueous electrochemical cell. 4,999,264, Cl. 429-171.000.

Sheridan, Philip L., to United States of America, National Aeronautics and Space Administration. Overcenter collet space station truss fastener. 4,998,842, Cl. 403-252.000.

Sherif, Fawzy G., to Stauffer Chemical Company. Process for bonding tiles to substrate using magnesium phosphate comprising activator prepared by mixing inert porous material with liquid P_2O_5 material. 4,999,066, Cl. 156-71.000.

Sherman, Adam, to Colgate-Palmolive Co. Flexible pouch contoured to facilitate pouring. 4,998,646, Cl. 222-107.000.

Sherman, Frederick R. Ski and snowboard sharpener. 4,998,956, Cl. 76-83.000.

Sherwood Medical Company: *See—*
Ranford, Alan B., 4,998,924, Cl. 604-798.000.

Shiba, Tetsuo, to Mitsubishi Denki Kabushiki Kaisha. MSM type semiconductor light responsive element. 4,999,695, Cl. 357-30.000.

Shibata, Shigehito: *See—*
Kojima, Hiroaki; Ichiki, Toshio; Shibata, Shigehito; Harada, Takeshi; Hirano, Eiji; and Atsuta, Shoji, 4,999,147, Cl. 264-139.000.

Shibaura Engineering Works Co., Ltd.: *See—*
Fukuyasu, Shigeki; Nakamura, Makoto; Kawachi, Kyozo; Yamaguchi, Seiji; Kinoshita, Sakan; and Numata, Tadashi, 4,999,203, Cl. 426-46.000.

Shibayama, Atsushi, to Nikon Corporation. Compact zoom lens. 4,998,808, Cl. 350-427.000.

Shibuya, Robert B.: *See—*
Allen, Michael P.; and Shibuya, Robert B., 4,999,287, Cl. 435-11.000.

Shick, David: *See—*
Ralph, John T.; Beckley, Guy B.; Brady, Frank T.; Jelenek, Ivan; Korn, Darryl K.; Meyer, John; Nay, Daniel L.; Searle, Colin M.; Shick, David; Williams, Richard W.; and Wilson, Jon C., deceased, 4,999,771, Cl. 364-200.000.

Shick, Steven D.: *See—*
Beach, Wayne H.; and Shick, Steven D., 4,998,574, Cl. 144-241.000.

Shigeki, Terumitsu; and Mizutani, Satoshi, to Toyoda Gosei Co., Ltd. Hose fitting fixing construction. 4,998,692, Cl. 248-56.000.

Shigematsu, Takashi: *See—*
Tokoro, Setsuo; Watanabe, Tomoyuki; Hayashi, Takashi; and Shigematsu, Takashi, 4,999,774, Cl. 364-424.100.

Shigetomi, Sadao: *See—*
Funakubo, Tomoki; Hakamatsuka, Yasuharu; Aihara, Mamoru; Watanabe, Kazuhiro; Koshiishi, Kiyozou; and Shigetomi, Sadao, 4,998,872, Cl. 425-143.000.

Shigetoshi, Imai; and Matoba, Yasuhiko, to Laurel Bank Machines Co., Ltd. Sheet discriminating apparatus. 4,998,998, Cl. 271-263.000.

Shiley, Robert J., to ITT Corporation. Guide pin apparatus for module connector. 4,998,892, Cl. 439-381.000.

Shillito, Raymond D.; Paszkowski, Jerzy; and Potrykus, Ingo, to Ciba-Geigy Corporation. Propagation process employing agarose medium. 4,999,299, Cl. 435-240.470.

Shimada, Akiko: *See—*
Amano, Toshio; and Shimada, Akiko, 4,999,622, Cl. 340-825.720.

Shimano Industrial Company Limited: *See—*
Sawada, Keiichi; and Nagano, Masashi, 4,998,907, Cl. 474-206.000.

Shimatani, Shigeru, to Pioneer Electronic Corporation. Electrical equipment chassis unit. 4,999,745, Cl. 361-429.000.

Shimizu, Atsushi: *See—*
Usami, Mitsuo; Shiozawa, Noboru; Yamada, Toshio; Katoh, Hiromasa; Satoh, Kazuyoshi; Kobayashi, Tohru; Kimura, Tatsuya; Hamamoto, Masato; Shimizu, Atsushi; and Koyu, Kaoru, 4,999,520, Cl. 307-456.000.

Shimizu, Isami: *See—*
Uematsu, Yoshihiro; Shimizu, Isami; and Hiramatsu, Naoto, 4,999,159, Cl. 420-53.000.

Shimizu, Isoo; Matsumura, Yasuo; and Arai, Yutaka, to Nippon Petrochemicals Company, Limited. Process for preparing alpha-(3-benzylphenyl) propionic acid derivative. 4,999,450, Cl. 560-101.000.

Shimizu, Koji; Yamadera, Toyohiko; and Hamada, Mitsuo, to Toray Silicone Company Ltd. Method and apparatus for the preparation of a water based dispersion of a viscous liquid. 4,999,131, Cl. 252-314.000.

Shimizu, Masami; Nakashima, Shigeo; Fujiwara, Yutaka; and Eguchi, Masaharu, to Canon Kabushiki Kaisha. Interchangeable lens with double-sided printed circuit board. 4,999,656, Cl. 354-195.120.

Shimizu, Osamu: *See—*
Tenmoku, Kenji; Shimizu, Osamu; Shimizu, Toshiyuki; and Mito, Kunihiko, 4,999,783, Cl. 364-450.000.

Shimizu, Takeshi; Saito, Kenji; Fushimi, Tomohisa; Huemann, Gisela; and Gonzales, Jose M., to Suzuki Motor Corporation. Armrest for mounting on a console box. 4,998,770, Cl. 296-37.800.

Shimizu, Toshiyuki: *See—*
Tenmoku, Kenji; Shimizu, Osamu; Shimizu, Toshiyuki; and Mito, Kunihiko, 4,999,783, Cl. 364-450.000.

Shimokawa, Shigeki: *See—*
Sugihara, Yasuo; and Shimokawa, Shigeki, 4,999,179, Cl. 423-584.000.

Shimomura, Akihiro: *See—*
Usami, Toshimasa; Hatakeyama, Seiji; Shimomura, Akihiro; and Iwakura, Ken, 4,999,333, Cl. 503-209.000.

Shin-Etsu Chemical Co., Ltd.: *See—*
Matsumoto, Fukuji; Tawara, Yoshio; and Hayashi, Michio, 4,999,228, Cl. 428-34.400.

Shin, Hyun J.: *See—*
Dhong, Sang H.; Chen, Chih-Liang; and Shin, Hyun J., 4,999,518, Cl. 307-446.000.

Shindoh, Shigeru: *See—*
Uemura, Susumu; Tomino, Tadashi; Tsujioka, Hiroshi; Yoneda, Shigeo; Shindoh, Shigeru; and Yatsuzuka, Yasuhumi, 4,999,617, Cl. 340-706.000.

Shinebuild Limited: *See—*
Connew, Raymond A., 4,998,391, Cl. 52-179.000.

Shinjo, Katsumi, to Yugenkaisha Shinjo Seisakusho. Self-drilling blind rivet and method for making same. 4,998,853, Cl. 411-29.000.

Shinko Electric Co., Ltd.: *See—*
Inoue, Kenji, 4,999,557, Cl. 318-609.000.

Shinonaga, Hirohiko: *See—*
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Suzuki, Tetsuji, 4,999,712, Cl. 358-213.110.

Shiozawa, Noboru: *See—*
Usami, Mitsuo; Shiozawa, Noboru; Yamada, Toshio; Katoh, Hiromasa; Satoh, Kazuyoshi; Kobayashi, Tohru; Kimura, Tatsuya; Hamamoto, Masato; Shimizu, Atsushi; and Koyu, Kaoru, 4,999,520, Cl. 307-456.000.

Shiraishi, Akihiko; Fujibayashi, Kazuo; and Kato, Masatake, to Canon Kabushiki Kaisha. Optical low-pass filter and photographic system using the same. 4,998,801, Cl. 350-162.200.

Shiraki, Keita: *See—*
Funahashi, Yoshiki; Matsumoto, Nobuo; and Shiraki, Keita, 4,998,345, Cl. 29-897.200.

Shizuno, Hisamitsu: *See—*
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,736, Cl. 361-321.000.
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,737, Cl. 361-321.000.
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,738, Cl. 361-321.000.
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,739, Cl. 361-321.000.

Shockey, Robert J.: *See—*
Bowers, William W.; Lieb, M. Jeremy; and Shockey, Robert J., 4,998,969, Cl. 123-187.50R.

Short, Kevin G.: *See—*
Sauter, Bruce M.; and Short, Kevin G., 4,998,304, Cl. 4-559.000.

Showa Denko Kabushiki Kaisha: *See—*
Morimoto, Shingo, 4,999,244, Cl. 428-372.000.

Shuie, William. Coin distinguishing mechanism for a coin keeper. 4,998,611, Cl. 194-337.000.

Shur, Michael: *See—*
Xu, Jingming; Shur, Michael; and Sweeny, Mark, 4,999,682, Cl. 357-4.000.

Siecor Corporation: *See—*
Smith, Edward P., 4,999,734, Cl. 361-278.000.

Siegel Heinz: *See—*
Kehl, Georg; Siegel Heinz; Deringer, Helmut; Rischen, Dietmar; Abbing, Andreas; and Bullinger, Alfred, 4,998,781, Cl. 303-10.000.

Siegel, Herbert: *See—*
Kampe, Klaus-Dieter; Usinger, Patricia; Siegel, Herbert; Alpermann, Hans G.; and Gerhards, Hermann J., 4,999,352, Cl. 514-235.800.

Siemens Aktiengesellschaft: *See—*
Achleitner, Erwin, 4,998,522, Cl. 123-491.000.
Brazdrum, Helmut; and Koch, Rudolf, 4,999,634, Cl. 341-172.000.
Draxelmayr, Dieter, 4,999,633, Cl. 341-120.000.
Koch, Rudolf, 4,999,588, Cl. 331-109.000.

Siemens Automotive L.P.: *See—*
Wright, Danny O., 4,998,520, Cl. 123-399.000.

Siemens-Pacesetter, Inc.: *See—*
Cohen, Donald M.; and Thacker, James R., 4,998,975, Cl. 128-419.00D.

Siemens Solar Industries, L.P.: *See—*
Szekely, Klara; Felder, Bethanne; and Wallace, Lloyd V., 4,999,060, Cl. 136-251.000.

Signode Corporation: *See—*
Sowa, Paul E.; and Linnerud, Neil D., 4,998,619, Cl. 206-392.000.

Sikkenga, David L.; Zaenger, Ian C.; and Williams, Gregory S., to Amoco Corporation. Palladium catalyst reactivation. 4,999,326, Cl. 502-30.000.

Silva, Michael L. Self-contained mobile hygiene cabinet. 4,998,302, Cl. 4-516.000.

Silva, Richard: *See—*
Fischer, Rich; Silva, Richard; and Welton, Henry P., 4,998,465, Cl. 99-584.000.

Silverman, Michael W.; Heinrich, Michael; Brubaker, Clifford E.; and McLaurin, Colin A., to Pin Dot Products. Mechanical shape sensor. 4,998,354, Cl. 33-514.200.

Silveston, Peter L., to Claritek Instruments Inc. Turbidity meter with parameter selection and weighting. 4,999,514, Cl. 250-575.000.
Silvestrini, Bruno: *See—*
Baiocchi, Leandro; and Silvestrini, Bruno, 4,999,367, Cl. 514-403.000.
Silvia, Denis A., to United States of America, Navy. Explosive logic clock. 4,998,963, Cl. 102-275.900.
Simons, Paul B. Absorber packing and method. 4,999,172, Cl. 423-226.000.
Singh, Gurdial: *See—*
Croman, Robert B.; Ghorashi, Hamid M.; and Singh, Gurdial, 4,999,395, Cl. 524-607.000.
Sirol, Graziano. Mill. 4,998,676, Cl. 241-55.000.
Skanberg, Enar T.; and Axelsson, Lars B., to General Engineering (Netherlands) B.V. Seat belt pre-tensioner. 4,999,004, Cl. 297-480.000.
Skelley, Arthur P.; and McMichael, James C. Waste heat recovery apparatus. 4,999,167, Cl. 422-175.000.
SKID, societe anonyme: *See—*
Bocquet, Jean-Pierre; and Vieau, Daniel, 4,999,224, Cl. 427-356.000.
Skinner, Geoffrey F.; and Kowal, Wieslaw M., to Foster Wheeler USA Corporation. Process for producing a methane-containing fuel gas. 4,999,030, Cl. 48-197.00R.
Skytta, Osmo, to Oy Tampella AB. Roll for the press in a paper machine or the like. 4,998,333, Cl. 29-130.000.
Slichter, Sherrill J.; and Deeg, H. Joachim, to Puget Sound Blood Center; and Fred Hutchinson Cancer Research Center. Method of reducing immunogenicity and inducing immunologic tolerance. 4,998,931, Cl. 604-20.000.
Slingsby, Roseanne W.: *See—*
Pohl, Christopher; Slingsby, Roseanne W.; Stillian, John R.; and Gajek, Ryszard, 4,999,098, Cl. 204-301.000.
Sloan Valve Company: *See—*
Pilolla, Joseph J., 4,998,673, Cl. 239-67.000.
Smith, B. Jack. Adjustable door stop. 4,998,941, Cl. 16-375.000.
Smith, David R., to Soldering Tool Reconditioning, Inc. Holder with automatic timed shut-off for large tipped electric soldering irons. 4,999,480, Cl. 219-242.000.
Smith, Edward P., to Siecor Corporation. Electrode array made from concave electrodes for meter reading device. 4,999,734, Cl. 361-278.000.
Smith, Kevin; and Zimmermann, Detlef, to Northern Telecom Limited. Sealing enclosures against electromagnetic interference. 4,999,459, Cl. 174-35.0GC.
Smith, Michael G.; Renga, James M.; Riley, Brian K.; Ray, Patricia G.; and Marlowe, Charles, to Dow Chemical Company, The. Method of preparing bis-phenol ethers. 4,999,448, Cl. 558-411.000.
Smith, Nels R.: *See—*
Van Order, Kim L.; Wright, Kevin L.; and Smith, Nels R., 4,998,765, Cl. 296-97.110.
Smith, Richard D. Oil containment system for emergency use. 4,998,845, Cl. 405-66.000.
Smith, Tracy L.: *See—*
Forney, Edgar W.; Gabany, Andrew J.; and Smith, Tracy L., 4,998,895, Cl. 439-585.000.
Smith, Walter P.: *See—*
Cioca, Gheorghe; Hayward, James A.; Tan, Manuel L.; Herstein, Morris; and Smith, Walter P., 4,999,348, Cl. 514-171.000.
Smithers, Scott T. Head support for salon basin. 4,998,303, Cl. 4-523.000.
SMS Schloemann-Siemag Aktiengesellschaft: *See—*
Seidel, Jurgen; and Rohde, Wolfgang, 4,998,338, Cl. 29-527.600.
Smutny, Edgar J., to Shell Oil Company. Polymer compositions. 4,999,399, Cl. 525-185.000.
Smy, Thomas: *See—*
Ristic, Ljubisa; Baltes, Heinrich P.; and Smy, Thomas, 4,999,692, Cl. 357-27.000.
Snare, Margaret J.; Yates, David; and Sanders, Ross, to ICI Australia Operations Proprietary Limited. Emulsion explosive composition containing a condensation product. 4,999,062, Cl. 149-2.000.
Snia Fibre SpA: *See—*
Paravella, Luciano; and Figini, Luigi, 4,998,857, Cl. 414-331.000.
Snow, Robert T.: *See—*
Towne, Raymond A.; Snow, Robert T.; and Preseby, Harry J., 4,998,446, Cl. 74-473.00R.
Soares, George G.: *See—*
Payne, Jewel; and Soares, George G., 4,999,192, Cl. 424-93.000.
Sochor, Jerzy R.: *See—*
Ishikawa, Kouji; Kawano, Kyoichiro; Murase, Teruo; Sochor, Jerzy R.; and Norman, C. Timothy, 4,998,884, Cl. 439-49.000.
Societa' Industriale Costruzioni Microelettriche: *See—*
Accati, Silla F.; and Reiser, Hans J., 4,999,166, Cl. 422-131.000.
Societa Italiana Vitro-SIV-S.p.A.: *See—*
Massarelli, Liberto; and Sampaolesi, Roberto, 4,998,392, Cl. 52-208.000.
Societe Quebecoise d'Initiatives Petrolieres: *See—*
Bose, Tapan K.; Chahine, Richard; and St-Arnaud, Jean-Marie, 4,999,330, Cl. 502-402.000.
Soga, Kazuo: *See—*
Doi, Yoshiharu; Soga, Kazuo; and Ueki, Satoshi, 4,999,409, Cl. 526-169.200.
Soldering Tool Reconditioning, Inc.: *See—*
Smith, David R., 4,999,480, Cl. 219-242.000.
Soler, Jean: *See—*
Schultz, Jean-Pierre; Soler, Jean; and Nicoud, Daniel, 4,999,474, Cl. 219-74.000.
Sollars, John A., to Milliken Research Corporation. Method to continuously count the courses or picks of a moving fabric. 4,999,488, Cl. 250-222.200.
Solodkaya, Tatyana I.: *See—*
Solodovnik, Valentin D.; Solodkaya, Tatyana I.; Litvinova, Maria T.; Meshkova, Taisa A.; Usova, Alexandra V.; and Davydov, Anatoly B., 4,999,188, Cl. 424-78.000.
Solodovnik, Valentin D.; Solodkaya, Tatyana I.; Litvinova, Maria T.; Meshkova, Taisa A.; Usova, Alexandra V.; and Davydov, Anatoly B. Methods for embolization of blood vessels. 4,999,188, Cl. 424-78.000.
Solomon, Donald D.; and Byron, M. Parke, to Becton, Dickinson and Company. Anti-infective and antithrombogenic medical articles and method for their preparation. 4,999,210, Cl. 427-2.000.
Solomon, Fred D. Solar water heating system. 4,998,558, Cl. 137-510.000.
Soltech, Inc.: *See—*
Nelson, Thomas E., 4,998,970, Cl. 126-376.000.
Soltis, Michael W.; and Mackool, Sam M., to Ford Motor Company. Method and apparatus for determining the center position of a vehicular steering system. 4,999,776, Cl. 364-424.050.
Solvay Automotive, Inc.: *See—*
Seizert, Robert D.; and Osborne, James R., 4,998,639, Cl. 220-85.00F.
Sonderhof, Dieter: *See—*
Kuhne, Helmut; Frassek, Karl-Heinz; Sonderhof, Dieter; Lanzrath, Gunther; Steinseifer, Fritz; and Beck, Heinz, 4,999,400, Cl. 525-196.000.
Sonenstein, Gerard G., to Colgate-Palmolive Co. Soil release polymers having improved performance, stability and economy. 4,999,128, Cl. 252-174.140.
Song, Choong-Eui: *See—*
Bertleff, Werner; Koeffer, Dieter; Klaeui, Wolfgang; and Song, Choong-Eui, 4,999,443, Cl. 556-136.000.
Sony Corporation: *See—*
Amano, Toshio; and Shimada, Akiko, 4,999,622, Cl. 340-825.720.
Miyaoka, Senri, 4,999,827, Cl. 369-44.180.
Yamazaki, Hiroshi; and Okazaki, Sakae, 4,999,709, Cl. 358-160.000.
Soos, Rudolf; Nemes, Jozsef; Szelestei, Miklos; Schler, Istvan; Vidra, Laszlo ; and Szekely, Istvan, to Chinoin Gyogyszer ES Vegyeszeti Termekek Gyara RT. Process for the preparation of trichloromethyl carbinols. 4,999,454, Cl. 560-213.000.
Sorensen, Gerald R.: *See—*
Kuhlman, Marvin G.; Sorensen, Gerald R.; and Gradecki, Raymond J., 4,999,465, Cl. 200-308.000.
Sorenson, John R. L. Analgesic method. 4,999,347, Cl. 514-159.000.
Sotome, Hiromi: *See—*
Kakubo, Yuji; and Sotome, Hiromi, 4,999,628, Cl. 341-139.000.
Southern Water Treatment Company, Inc.: *See—*
Bowers, Gregory S., 4,999,116, Cl. 210-709.000.
Souza, Lawrence M., to Amgen Inc. Production of human pluripotent granulocyte colony-stimulating factor. 4,999,291, Cl. 435-69.100.
Sowa, Paul E.; and Linnerud, Neil D., to Signode Corporation. Close-pack, vertical-stack webbing roll packaging. 4,998,619, Cl. 206-392.000.
Spahl, Bettina: *See—*
Kosley, Raymond W., Jr.; O'Malley, Gerard; and Spahl, Bettina, 4,999,351, Cl. 514-228.200.
Sparer, Steven J.; and Morris, William I., to Eastman Kodak Company. Sheet-feeding apparatus with one-way clutch to avoid premature sheet-feed during sheet reloading. 4,998,714, Cl. 271-117.000.
Sparrell, Duncan K.: *See—*
Fite, Franklin D., Jr.; and Sparrell, Duncan K., 4,999,829, Cl. 370-16.000.
Spector, George: *See—*
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Spectranetics Corporation, The: *See—*
Holzman, Melvyn, 4,998,794, Cl. 350-96.180.
Spectrum International, Inc.: *See—*
Box, Thomas, 4,998,967, Cl. 119-22.000.
Spectrum Sciences B.V.: *See—*
Landa, Benzion; and Fenster, Paul, 4,999,677, Cl. 355-273.000.
Speer, Larry W.; and Westbrook, Susan P., to Eastman Kodak Company. Magnetic brush development apparatus including a self-adjustable take-off skive. 4,999,675, Cl. 355-245.000.
Spence, Rosamund A.: *See—*
Crowley, Patrick J.; Glen, Alasdair T.; and Spence, Rosamund A., 4,999,381, Cl. 514-618.000.
Spencer, Donald R. Container for holding spools of thin line. 4,998,685, Cl. 242-137.000.
Spencer, Henry A. Book-type container for raising seedlings. 4,998,378, Cl. 47-77.000.
Spielberger, Richard K.: *See—*
Dunaway, Thomas J.; Spielberger, Richard K.; and Poplett, James M., 4,999,700, Cl. 357-70.000.
Spielmann, Daniele: *See—*
Berger, Manfred; Spielmann, Daniele; and Traitler, Helmut, 4,999,380, Cl. 514-558.000.
Spier, Eric A., to Irvin Automotive Products, Inc. Magnetic switch and latch for vehicle accessories. 4,999,599, Cl. 335-207.000.
Spies, Klaus: *See—*
Erlenmaier, Gunter; and Spies, Klaus, 4,998,783, Cl. 305-56.000.

Spinelli, Silvano: *See*—
Gandolfi, Carmelo A.; Frigerio, Marco; Spinelli, Silvano; Tofanetti, Odoardo; and Tognella, Sergio, 4,999,362, Cl. 514-334.000.
Spirnak, Josephine A.: *See*—
Sabatelli, Anthony D.; and Spirnak, Josephine A., 4,999,186, Cl. 424-60.000.
Sprecker, Mark A.; Belko, Robert P.; Hanna, Marie R.; Beck, Charles E. J.; and Brucato, Salvatore M., to International Flavors & Fragrances Inc. Alkyl-substituted tetra- or hexahydrobenzopyran derivatives, organoleptic uses thereof and process for preparing same. 4,999,439, Cl. 549-397.000.
Spring, Bonnie: *See*—
Wurtman, Richard J.; Wurtman, Judith J.; and Spring, Bonnie, 4,999,382, Cl. 514-646.000.
Spring, Gorden W.: *See*—
Garner, Harold E.; Miller, Merrill M.; Kavanagh, Brian E.; and Spring, Gorden W., 4,998,902, Cl. 446-2.000.
Square D Company: *See*—
Yin, Simon, 4,999,463, Cl. 200-144.00B.
Squire, Edward N., to Du Pont de Nemours, E. I., and Company. Amorphous copolymers of perfluoro-2,2-dimethyl-1,3-dioxole. 4,999,248, Cl. 428-422.000.
Staab, Heinz A.; and Elbl, Karin, to Max-Planck-Gesellschaft zur Foerderung der Wissenschaften e.V. Tetrakis(dialkylamino)aromatics and their charge transfer complexes. 4,999,441, Cl. 552-291.000.
Staheli, Paul; and Verzilli, Giuseppe, to Rieter Machine Works, Ltd. Card having a transverse conveyor with a trapezoidally cross-sectioned shoulder, for conveying a web laterally away from the card. 4,998,325, Cl. 19-106.00R.
Stahly, G. Patrick, to Ethyl Corporation. Process for the preparation of α,α,β-1-trifluoro-1-olefinic derivatives. 4,999,429, Cl. 546-21.000.
Stames, Rebecca M. Hypothermia protection suit collapsible into compact package for storage. 4,998,296, Cl. 2-69.500.
Stampfli, Jean-Marcel, to ETA SA Fabriques d'Ebauches. Electronic module for a small portable object such as a card or a key incorporating an integrated circuit. 4,999,742, Cl. 361-400.000.
Standard Register Co., The: *See*—
Mehta, Rajendra; Lakes, Dale; and Saluke, William, 4,999,334, Cl. 503-226.000.
Standard Textile Company, Inc.: *See*—
Taylor, Jeffrey L., 4,998,620, Cl. 206-440.000.
Standing, Donald J.: *See*—
Watterson, Scott R.; Standing, Donald J.; and Dalebout, William T., 4,998,725, Cl. 272-129.000.
Stankosky, Michael J., to Emhart Industries, Inc. Glassware forming machine. 4,999,040, Cl. 65-325.000.
Stapel, Wilhelm: *See*—
Goebbels, Hans R.; Biermann, Kurt; Steppat, Gerhard; Stapel, Wilhelm; Rosemann, Michael; and Seiler, Klaus D., 4,998,490, Cl. 112-231.000.
Starkey, Donald R., to D & L Incorporated. Mold with slide retainer. 4,998,875, Cl. 425-577.000.
Stauffer Chemical Company: *See*—
Sherif, Fawzy G., 4,999,066, Cl. 156-71.000.
Stavros, Anthony J.: *See*—
Jackson, John E.; McCaslin, Lynn M.; Stavros, Anthony J.; and Tucker, Robert C., Jr., 4,999,255, Cl. 428-552.000.
Stax Industries Limited: *See*—
Hayashi, Naotake, 4,999,602, Cl. 338-308.000.
Stead, Ronald, to Northern Engineering Industries PLC. Condensing type boilers. 4,998,508, Cl. 122-4.00D.
Stecher, Werner: *See*—
Schetina, Otto; Kissich, Arnulf; Stecher, Werner; Habenicht, Helmut; Papst, Wilhelm; and Pleterski, Bernhard, 4,998,777, Cl. 299-67.000.
Stechl, Jens: *See*—
Ruger, Wolfgang; Urbach, Hansjorg; Henning, Rainer; Stechl, Jens; Usinger, Patricia; and Hock, Franz, 4,999,370, Cl. 514-412.000.
Steele, James R., to Litton Systems, Inc. Rotation rate nulling servo and method for fiber optic rotation sensor. 4,998,822, Cl. 356-350.000.
Steffen, Robert J.: *See*—
Dighe, Shyam V.; Taylor, Raymond F., Jr.; Steffen, Robert J.; and Rohaus, David M., 4,998,486, Cl. 110-346.000.
Stein, Daryl L.: *See*—
Bohen, Joseph M.; Reifenberg, Gerald H.; and Stein, Daryl L., 4,999,391, Cl. 524-94.000.
Steiner, Johann: *See*—
Adler, Robert; Fendley, James R.; Lange, Howard G.; Prazak, Charles J., III; Steiner, Johann; and Strauss, Paul, 4,998,901, Cl. 445-3.000.
Steinseifer, Fritz: *See*—
Kuhne, Helmut; Frassek, Karl-Heinz; Sonderhof, Dieter; Lanzrath, Gunther; Steinseifer, Fritz; and Beck, Heinz, 4,999,400, Cl. 525-196.000.
Stephens, Edward L. Switchable automotive circuit test light. 4,999,574, Cl. 324-133.000.
Steppat, Gerhard: *See*—
Goebbels, Hans R.; Biermann, Kurt; Steppat, Gerhard; Stapel, Wilhelm; Rosemann, Michael; and Seiler, Klaus D., 4,998,490, Cl. 112-231.000.
Sterling Plumbing Group, Inc.: *See*—
Sauter, Bruce M.; and Short, Kevin G., 4,998,304, Cl. 4-559.000.
Stern, Philip A.: *See*—
Joseph, Brian J.; Mort, Thomas W.; Stern, Philip A.; and Westcott, Robert M., 4,999,680, Cl. 355-326.000.
Stewart, Brian S.; Sacherman, James E.; and Toor, John W., to Acme Frame Products, Inc. Picture frame assembly. 4,998,362, Cl. 40-152.100.
Stewart, David A.: *See*—
Brown, Gordon T.; and Stewart, David A., 4,998,442, Cl. 74-89.170.
Stewart, Richard M. Portable illuminated bookholder and lectern. 4,998,703, Cl. 248-447.000.
Stifter, Francis J. Satellite receiver protection apparatus. 4,999,729, Cl. 361-56.000.
Stigliani, Daniel J., Jr.: *See*—
Boerstler, David W.; and Stigliani, Daniel J., Jr., 4,998,792, Cl. 350-96.150.
Stillian, John R.: *See*—
Pohl, Christopher; Slingsby, Roseanne W.; Stillian, John R.; and Gajek, Ryszard, 4,999,098, Cl. 204-301.000.
Stiso, S. Nicholas, to Syntex (U.S.A.) Inc. Chromatographic cassette. 4,999,285, Cl. 435-7.900.
Stitt, R. Mark, II: *See*—
Burt, Rodney T.; Kalthoff, Timothy V.; Heisley, David A.; and Stitt, R. Mark, II, 4,999,585, Cl. 332-149.000.
Stobby, William G.: *See*—
McCullough, Francis P., Jr.; Hall, David M.; Stobby, William G.; and Suh, Kyung W., 4,999,385, Cl. 521-149.000.
Stocchiero, Olimpio. Mould with a single-block plunger for the moulding of electric accumulator boxes. 4,998,874, Cl. 425-556.000.
Stocco, Joseph A.; and Bradt, Howard J., to Lucas Aerospace Power Transmission Corp. Variable displacement high pressure pump with internal power limiting arrangement. 4,999,020, Cl. 417-222.000.
Stockman, James E., III: *See*—
Leo, Robert P.; McColgan, Mark W.; Stockman, James E., III; and Young, Jeffrey H., 4,999,834, Cl. 370-94.100.
Stoffel, Josef: *See*—
Bergmin, Renzo; Quittmann, Wilhelm; and Stoffel, Josef, 4,999,438, Cl. 549-329.000.
Stone, Paul A.: *See*—
Chaconas, Peter C.; and Stone, Paul A., 4,998,454, Cl. 81-460.000.
Strauss, Paul: *See*—
Adler, Robert; Fendley, James R.; Lange, Howard G.; Prazak, Charles J., III; Steiner, Johann; and Strauss, Paul, 4,998,901, Cl. 445-3.000.
Strife, James R.: *See*—
Prewo, Karl M.; Nardone, Vincent C.; and Strife, James R., 4,999,256, Cl. 428-552.000.
Strong, Bernard, to Pavel Jordan & Associates. Filling device with sound indicator for filling injection syringe. 4,998,570, Cl. 141-27.000.
Strupczewski, Joseph T., to Hoechst-Roussel Pharmaceuticals, Inc. 1-phenyl-3-(1-piperazinyl)-1H-indazoles. 4,999,356, Cl. 514-254.000.
Stuart, Keith O., to Aura Systems, Inc. Force and torque measurement system. 4,998,441, Cl. 73-862.040.
Stumpf, David K.; and Blair, Curt N. Method and means for condensing trace air contaminates from gases. 4,998,433, Cl. 73-25.010.
Su, Wei-Fang A.; Barrett, Anthony P.; Scala, Luciano C.; and Schoch, Karl F., Jr., to Westinghouse Electric Corp. Ultraviolet curable conductive resin. 4,999,136, Cl. 252-512.000.
Sud-Chemie Aktiengesellschaft: *See*—
Mager, Peter; and Schenkel, Willi, 4,999,034, Cl. 55-275.000.
Sudol, Charles W.: *See*—
Bouchard, William L.; Cummings, Robert E.; Kalinowski, Paul W.; and Sudol, Charles W., 4,998,384, Cl. 51-168.000.
Suenaga, Haruo: *See*—
Sakamoto, Kazuho; Niwa, Takashi; Suenaga, Haruo; and Matsumoto, Takahiro, 4,999,762, Cl. 363-144.000.
Sugihara, Yasuo; and Shimokawa, Shigeki, to Mitsubishi Gas Chemical Company, Inc. Method for purifying impure aqueous hydrogen peroxide solution. 4,999,179, Cl. 423-584.000.
Sugimoto, Yasuhiro, to Kabushiki Kaisha Toshiba. High-precision and high-speed analog/digital converter having low power consumption. 4,999,631, Cl. 341-156.000.
Sugimoto, Yoshinobu; Mizuguchi, Yoshifumi; and Hoshino, Yoshinobu, to Yazaki Corporation; Yazaki Electric Wire Co., Ltd.; and Nippon Oil and Fats Co., Ltd. Method of forming a colored coating film on a cross-linked polyethylene sheet or electric wire. 4,999,247, Cl. 428-383.000.
Suginoya, Mitsuru: *See*—
Kamamori, Hitoshi; Iwasa, Koji; Suginoya, Mitsuru; Sano, Yutaka; Terada, Yumiko; and Kato, Naoki, 4,999,094, Cl. 204-180.200.
Sugita, Ryuji: *See*—
Honda, Kazuyoshi; Sugita, Ryuji; Tohma, Kiyokazu; Kawawake, Yasuihiro; and Murakami, Yoshiki, 4,999,220, Cl. 427-132.000.
Sugiyama, Kazuhiro; and Atsumi, Yoshinori, to Casio Computer Co., Ltd. Conductive connecting structure. 4,999,460, Cl. 174-94.00R.
Suh, Kyung W.: *See*—
McCullough, Francis P., Jr.; Hall, David M.; Stobby, William G.; and Suh, Kyung W., 4,999,385, Cl. 521-149.000.
Suh, Nam P.: *See*—
Sanchez-Caldera, Luis E.; Lee, Arthur K.; Suh, Nam P.; and Chun, Jung-Hoon, 4,999,050, Cl. 75-244.000.
Sulhoff, James W.: *See*—
Austin, Richard F.; Feldman, Robert D.; Sulhoff, James W.; and Zyskind, John L., 4,999,694, Cl. 357-30.000.
Sulzer-Escher Wyss GmbH: *See*—
Lang, Heinrich; and Selder, Harald, 4,999,084, Cl. 162-4.000.
Sumitomo Chemical Co. Ltd.: *See*—
Kato, Yasuyuki; Matsuda, Masaaki; and Ochi, Kenji, 4,999,171, Cl. 423-112.000.

Sumitomo Electric Industries, Ltd.: *See*—
Miyamoto, Yoshinari; and Nakata, Hirohiko, 4,999,144, Cl. 264-56.000.
Tenmoku, Kenji; Shimizu, Osamu; Shimizu, Toshiyuki; and Mito, Kunihiko, 4,999,783, Cl. 364-450.000.
Ueno, Keiji; and Saen, Haruo, 4,999,141, Cl. 264-1.400.
Sumitomo Rubber Industries, Ltd.: *See*—
Katou, Masayuki, 4,998,980, Cl. 152-324.000.
Matsuki, Taketo, 4,999,404, Cl. 525-329.600.
Summagraphics Corporation: *See*—
Purcell, Alexander M., 4,999,462, Cl. 178-19.000.
Summer, Steven E., to Powr-Ups Corporation. Luminaire system. 4,999,545, Cl. 315-219.000.
Summers, Donald J.: *See*—
Kaufman, John W.; and Summers, Donald J., 4,998,887, Cl. 439-78.000.
Summers, Eugene R. Earth anchor driving and removing apparatus and method therefore. 4,998,849, Cl. 405-303.000.
Summerville, Jeanie. Sanitary toilet seat cover. 4,998,297, Cl. 4-242.000.
Sunclipse, Inc.: *See*—
Huang, Harrison, 4,998,655, Cl. 225-26.000.
Sunds Defibrator Rauma Oy: *See*—
Luntamo, Juhani, 4,999,085, Cl. 162-40.000.
Sung, Janmye: *See*—
Lu, Chih-Yuan; Sung, Janmye; and Wong, Yiu M., 4,999,317, Cl. 437-189.000.
Sunley, Raymond L.: *See*—
Elliott, Raymond; Dalziel, John; and Sunley, Raymond L., 4,999,043, Cl. 71-92.000.
Suntory Limited: *See*—
Idaka, Eiichi, 4,999,423, Cl. 536-4.100.
Sutek Corporation: *See*—
Sanchez-Caldera, Luis E.; Lee, Arthur K.; Suh, Nam P.; and Chun, Jung-Hoon, 4,999,050, Cl. 75-244.000.
Suter, Richard R.; and Moen, Russell R., Jr., to AT&E Corporation. Combined bias supply power shut-off circuit. 4,999,516, Cl. 307-296.300.
Sutherland, Albert J.; and Sutherland, Neil K. Domestic carbonator. 4,999,140, Cl. 261-59.000.
Sutherland, Neil K.: *See*—
Sutherland, Albert J.; and Sutherland, Neil K., 4,999,140, Cl. 261-59.000.
Suzuki, Hideo; Matsushima, Shunichi; Obata, Masahiko; and Sakama, Masao, to Yamaha Corporation. Handheld musical tone controller. 4,998,457, Cl. 84-600.000.
Suzuki, Isao: *See*—
Morishima, Yoichi; Kobayashi, Kazuo; and Suzuki, Isao, 4,999,560, Cl. 318-779.000.
Suzuki, Kenji; and Nakamura, Hiroaki, to Fuji Photo Film Co., Ltd. Exposure control method for photographic printer. 4,999,668, Cl. 355-38.000.
Suzuki, Masayuki: *See*—
Fukahori, Hidehiko; Suzuki, Masayuki; and Aihara, Yoshihiko, 4,999,655, Cl. 354-173.100.
Suzuki Motor Corporation: *See*—
Shimizu, Takeshi; Saito, Kenji; Fushimi, Tomohisa; Huemann, Gisela; and Gonzales, Jose M., 4,998,770, Cl. 296-37.800.
Suzuki, Satoru: *See*—
Akiba, Tetsunori; Yamaguchi, Shotaro; Suzuki, Satoru; Isobe, Kimiyasu; and Matsunaga, Kuniyoshi, 4,999,289, Cl. 435-19.000.
Suzuki, Shigehiko, to Mitsubishi Denki Kabushiki Kaisha. Method of and apparatus for controlled operation of an elevator system at the occurrence of an earthquake. 4,998,601, Cl. 187-107.000.
Suzuki, Takao: *See*—
Ueno, Atsushi; and Suzuki, Takao, 4,999,713, Cl. 358-225.000.
Suzuki, Takeshi; and Kagami, Yuji, to Canon Kabushiki Kaisha. Hand recording apparatus. 4,999,016, Cl. 400-88.000.
Suzuki, Tatsuo; and Isono, Keinosuke, to Material Engineering Technology Laboratory, Incorporated. Medical fluid-filled plastic container and methods of making same. 4,998,400, Cl. 53-425.000.
Suzuki, Tetsuji: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Suzuki, Tetsuji, 4,999,712, Cl. 358-213.110.
Suzuki, Tohru: *See*—
Kiyomura, Akio; Terashima, Takayoshi; and Suzuki, Tohru, 4,999,683, Cl. 357-13.000.
Suzuki, Toshimichi, to Sawafui Electric Co., Ltd. Separately power-feeding welding generator. 4,999,563, Cl. 322-90.000.
Suzuki, Yoshiyuki; Aoki, Kunimitsu; and Iino, Tadashi, to Yazaki Corporation. Display apparatus for a vehicle. 4,999,011, Cl. 353-14.000.
Suzuki, Yoshiyuki; Aoki, Kunimitsu; and Iino, Tadashi, to Yazaki Corporation. Display apparatus for a vehicle. 4,999,012, Cl. 353-14.000.
Svensson, E. Gunnar, to Autopart Sweden AB. Sunvisor for motor vehicles. 4,999,746, Cl. 362-74.000.
Swann-Morton Limited: *See*—
Pemberton, John H.; and Dear, Stephen L., 4,998,334, Cl. 29-239.000.
Sweeny, Mark: *See*—
Xu, Jingming; Shur, Michael; and Sweeny, Mark, 4,999,682, Cl. 357-4.000.
Sweet, James: *See*—
Rogers, Jack; and Sweet, James, 4,999,752, Cl. 362-228.000.
Synk, James E.: *See*—
Nadkarni, Anil; Samal, Prasan K.; and Synk, James E., 4,999,336, Cl. 505-1.000.
Syntex (U.S.A.) Inc.: *See*—
Stiso, S. Nicholas, 4,999,285, Cl. 435-7.900.
Syring, Gary J.: *See*—
Bowman, Bruce R.; Oran, Michael R.; and Syring, Gary J., 4,999,772, Cl. 364-413.050.
Szekely, Istvan: *See*—
Soos, Rudolf; Nemes, Jozsef; Szelestei, Miklos; Schler, Istvan; Vidra, Laszlo ; and Szekely, Istvan, 4,999,454, Cl. 560-213.000.
Szekely, Klara; Felder, Bethanne; and Wallace, Lloyd V., to Siemens Solar Industries, L.P. Solar cell packaging assembly for self-contained light. 4,999,060, Cl. 136-251.000.
Szelestei, Miklos: *See*—
Soos, Rudolf; Nemes, Jozsef; Szelestei, Miklos; Schler, Istvan; Vidra, Laszlo ; and Szekely, Istvan, 4,999,454, Cl. 560-213.000.
T. A. Pelsue Company: *See*—
Niksic, Mark R.; and Erickson, Mark E., 4,998,552, Cl. 135-102.000.
Tacan Corporation: *See*—
Salour, Michael M.; and Bechtel, James H., 4,998,803, Cl. 350-321.000.
Tadayon, Fereshteh, to Alusuisse Lonza-Services Ltd. Preheat indicator. 4,999,101, Cl. 210-85.000.
Tai, Kuochou: *See*—
Huang, Kai-Feng; Jewell, Jack L.; McCall, Samuel L., Jr.; and Tai, Kuochou, 4,999,842, Cl. 372-45.000.
Taiyo Yden Co., Ltd.: *See*—
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,736, Cl. 361-321.000.
Taiyo Yuden Co., Ltd.: *See*—
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,737, Cl. 361-321.000.
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,738, Cl. 361-321.000.
Kishi, Hiroshi; Chazono, Hirokazu; Oshio, Minoru; Saito, Hiroshi; Nakamura, Toshiya; and Shizuno, Hisamitsu, 4,999,739, Cl. 361-321.000.
Takahashi, Isami: *See*—
Nakano, Hirofumi; Hara, Mitsunobu; Takahashi, Isami; Asano, Kozo; Iida, Takao; and Morimoto, Makoto, 4,999,196, Cl. 424-116.000.
Takahashi, Kenji: *See*—
Nakamura, Takashi; and Takahashi, Kenji, 4,999,515, Cl. 250-484.100.
Takahashi, Kuniyoshi: *See*—
Ohashi, Mitsuo; Nakagawa, Jun; and Takahashi, Kuniyoshi, 4,999,578, Cl. 324-158.00F.
Takahashi, Shoji, to Citizen Watch Co., Ltd. Read/write head carrying mechanism for floppy disk drive. 4,999,725, Cl. 360-105.000.
Takahashi, Toshimasa: *See*—
Fudono, Kanji; Ogawa, Hiroshi; Takahashi, Toshimasa; and Yamashita, Toshio, 4,998,582, Cl. 165-11.100.
Takahatakae, Yuriko: *See*—
Kondo, Kiyoshi; Matsui, Kiyohide; Negishi, Akira; and Takahatakae, Yuriko, 4,999,451, Cl. 560-124.000.
Takahumi, Tokunaga; Masatoshi, Tsuneoka; Hiroyuki, Akimori; and Mitsuaki, Horiuch, to Hitachi, Ltd. Method for forming metal layer interconnects using stepped via walls. 4,999,318, Cl. 437-194.000.
Takaki, Hisashi: *See*—
Senso, Hitoshi; and Takaki, Hisashi, 4,999,710, Cl. 358-160.000.
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Suzuki, Tetsuji, to Victor Company of Japan, Ltd. Photoelectric converting device for forming charge latent image and recording system thereof. 4,999,712, Cl. 358-213.110.
Takashima, Tadashi: *See*—
Koda, Yoshiharu; and Takashima, Tadashi, 4,999,546, Cl. 315-225.000.
Takeda, Toshihiko: *See*—
Watanabe, Nobuo; Tsukamoto, Takeo; Takeda, Toshihiko; Ono, Haruhito; and Okunuki, Masahiko, 4,999,083, Cl. 156-628.000.
Takeguchi, Shunsuke: *See*—
Hiraoka, Takeshi; Takeguchi, Shunsuke; and Kawai, Satoshi, 4,998,955, Cl. 74-567.000.
Takei, Masahiro: *See*—
Kozuki, Susumu; Ushiro, Tatsuzo; Masui, Toshiyuki; Takei, Masahiro; and Nagasawa, Kenichi, 4,999,722, Cl. 360-77.150.
Takei, Tetsuya: *See*—
Okamura, Ryuji; Otoshi, Hirokazu; and Takei, Tetsuya, 4,999,214, Cl. 427-39.000.
Takemori, Toshio; Arakawa, Tsutomu; Matsumoto, Teruo; and Maruyama, Takashi, to Lotte Company Limited. Composition for oral cavity. 4,999,185, Cl. 424-58.000.
Takemura, Kenji: *See*—
Azuma, Hiroshi; Takemura, Kenji; and Itoh, Kohji, 4,999,530, Cl. 310-12.000.
Takemura, Moriyuki: *See*—
Chida, Shohei; Kozaki, Masami; Asahi, Toshinori; Ono, Chiyoaki; Iwasa, Seiji; Fukunaga, Taizou; and Takemura, Moriyuki, 4,998,776, Cl. 299-59.000.
Takenaka, Shigeo, to Toyo Boseki Kabushiki Kaisha. Photosensitive resin composition. 4,999,279, Cl. 430-781.000.

Taketani, Stanley: *See—*
Park, Joon; Taketani, Stanley; Leung, Han C.; and Pelzman, George, 4,998,712, Cl. 269-25.000.

Takizawa, Shuichi: *See—*
Nebashi, Tutomu; Yabe, Shinichi; Yamaguchi, Nobuyoshi; Takizawa, Shuichi; and Sai, Fumio, 4,999,138, Cl. 252-543.000.

Tallon, Thomas G.: *See—*
Biermacher, Richard F.; Tallon, Thomas G.; Black, Dwayne A.; and Barton, Billy J., 4,998,766, Cl. 296-136.000.

Tambe, Atul; and Wilson, Michael, to Hewlett-Packard Company. Method and apparatus for measurement gate display. 4,999,573, Cl. 324-121.00R.

Tan, Manuel L.: *See—*
Cioca, Gheorghe; Hayward, James A.; Tan, Manuel L.; Herstein, Morris; and Smith, Walter P., 4,999,348, Cl. 514-171.000.

Tanaka, Haruo: *See—*
Sakiyama, Hajime; Tanaka, Haruo; and Mushiage, Masato, 4,999,841, Cl. 372-45.000.

Tanaka, Hiroshi: *See—*
Funahashi, Takeshi; and Tanaka, Hiroshi, 4,999,497, Cl. 250-327.200.

Tanaka, Hiroyosh: *See—*
Orino, Shoji; Tanaka, Hiroyosh; and Kuroda, Akiteru, 4,999,245, Cl. 428-374.000.

Tanaka, Kohbun, to Kabushiki Kaisha Tokai-Rika-Denki-Seisakusho. Buckle device. 4,998,328, Cl. 24-639.000.

Tanaka, Osamu: *See—*
Graiver, Daniel; and Tanaka, Osamu, 4,999,398, Cl. 524-837.000.

Tanaka, Seiichi: *See—*
Inoue, Seiji; and Tanaka, Seiichi, 4,998,521, Cl. 123-424.000.

Tanaka Seimitu Kogyo Kabushiki Kaisha: *See—*
Fujiwara, Hideaki, 4,998,445, Cl. 74-339.000.

Tanaka, Seiya: *See—*
Mizutani, Kenichiro; Tanaka, Seiya; and Ohmi, Atsushi, 4,998,607, Cl. 192-58.00B.

Tanaka, Takafumi, to Brother Kogyo Kabushiki Kaisha. Edge tracing sewing machine. 4,998,493, Cl. 112-453.000.

Tanaka, Yutaka: *See—*
Mizusawa, Nobutoshi; Tanaka, Yutaka; and Ebinuma, Ryuichi, 4,999,506, Cl. 250-491.100.

Tanashin Denki Co., Ltd.: *See—*
Yamanaka, Takashi, 4,999,723, Cl. 360-96.500.

Tange, Keigo, to Minolta Camera Kabushiki Kaisha. Cleaning apparatus for cleaning the surface of a photosensitive member. 4,999,678, Cl. 355-297.000.

Taniguchi, Hiroshi: *See—*
Akagi, Yoshiro; Ishino, Mariko; Inoue, Atsuhisa; Kaminishi, Shigeru; and Taniguchi, Hiroshi, 4,999,215, Cl. 427-41.000.

Taniguchi, Mitsuru: *See—*
Terai, Akio; Yoshino, Junichi; Satsumi, Shinroku; and Taniguchi, Mitsuru, 4,998,401, Cl. 56-255.000.

Tanikawa, Hirohide; Nakahara, Toshiaki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Sakashita, Kiichiro, to Canon Kabushiki Kaisha. Electrophotographic analog and digital imaging and developing using magnetic toner. 4,999,272, Cl. 430-106.600.

Tanner, Werner: *See—*
Bolli, Peter; and Tanner, Werner, 4,998,903, Cl. 446-102.000.

Tanzawa, Kenji: *See—*
Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,998,867, Cl. 418-256.000.
Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,998,868, Cl. 418-257.000.

Tarlow, Kenneth A.; and Gray, Ronald E., to Gray, Ron. Portable memo pad holder device for car and phone. 4,998,704, Cl. 248-447.100.

Tate, Takuo, to Nippon Filcon Co., Ltd. Single-layer papermaking broken-twill fabric avoiding wire marks. 4,998,569, Cl. 139-383.00A.

Tateno, Yoshiaki; Yoneda, Susumu; Okamoto, Naoki; Ishii, Yoshibumi; and Kato, Kazuaki, to Towa Chemical Industry Co., Ltd. Process for preparing trans-1,4-cyclohexanedimethanol and powder of the same. 4,999,090, Cl. 203-36.000.

Taunton Technologies, Inc.: *See—*
Labinger, Richard; Macri, Timothy F.; Yoder, Paul R., Jr.; and Valovich, David J., 4,998,819, Cl. 351-212.000.

Tavener, Phillip J.: *See—*
Rothon, Roger N.; Ryan, Thomas A.; and Tavener, Phillip J., 4,999,387, Cl. 523-205.000.

Tawara, Yoshio: *See—*
Matsumoto, Fukuji; Tawara, Yoshio; and Hayashi, Michio, 4,999,228, Cl. 428-34.400.

Taylor, Bruce E., to Monarch Marking Systems, Inc. Slide assembly for mounting a print ribbon. 4,998,834, Cl. 400-247.000.

Taylor, Jeffrey L., to Standard Textile Company, Inc. Sterilized pack of fabric articles. 4,998,620, Cl. 206-440.000.

Taylor, Raymond F., Jr.: *See—*
Dighe, Shyam V.; Taylor, Raymond F., Jr.; Steffen, Robert J.; and Rohaus, David M., 4,998,486, Cl. 110-346.000.

Teepak, Inc.: *See—*
Bridgeford, Douglas J., 4,999,425, Cl. 536-30.000.

Teijin Chemicals, Ltd.: *See—*
Tsutsumi, Teruyuki; Sato, Tetsunori; and Arita, Akira, 4,998,377, Cl. 43-125.000.

Tektronix, Inc.: *See—*
Knierim, David L.; and Brown, Gary L., 4,999,702, Cl. 358-32.000.

Telatemp Corporation: *See—*
Wood, Don E.; and Scharf, Wayne, 4,998,826, Cl. 374-129.000.

Telectronics Pacing Systems, Inc.: *See—*
Aker, David, 4,998,974, Cl. 128-419.0PG.

Teledyne Kinetics: *See—*
Werner, Oskar O., 4,998,886, Cl. 439-66.000.

Tellier, Gilbert F., to Rockwell International Corporation. Face seal assembly. 4,998,740, Cl. 277-205.000.

Temple, Victor A. K., to General Electric Company. Symmetrical blocking high voltage breakdown semiconducotr device. 4,999,684, Cl. 357-13.000.

Tendapak Technologies Pty. Ltd.: *See—*
Gibson, Royce G., 4,999,204, Cl. 426-104.000.

Ten Eyck, John D., to Carborundum Company, The. Crack resistant intumescent sheet material. 4,999,168, Cl. 422-179.000.

Tenmoku, Kenji; Shimizu, Osamu; Shimizu, Toshiyuki; and Mito, Kunihiko, to Sumitomo Electric Industries, Ltd. Location detecting method. 4,999,783, Cl. 364-450.000.

Terada, Yumiko: *See—*
Kamamori, Hitoshi; Iwasa, Koji; Suginoya, Mitsuru; Sano, Yutaka; Terada, Yumiko; and Kato, Naoki, 4,999,094, Cl. 204-180.200.

Terai, Akio; Yoshino, Junichi; Satsumi, Shinroku; and Taniguchi, Mitsuru, to Komatsu Zenoah Co. Mowing machine. 4,998,401, Cl. 56-255.000.

Terasawa, Koji, to Canon Kabushiki Kaisha. Discharge recovery device and apparatus having suction means and vent means communicating with capping means. 4,999,643, Cl. 346-1.100.

Terashima, Shigeo: *See—*
Fuji, Hiroshi; Maeda, Shigemi; Sakamoto, Noriaki; Terashima, Shigeo; Yamaguchi, Takeshi; Tsuji, Kentaro; and Kojima, Kunio, 4,999,824, Cl. 369-13.000.

Terashima, Takayoshi: *See—*
Kiyomura, Akio; Terashima, Takayoshi; and Suzuki, Tohru, 4,999,683, Cl. 357-13.000.

Terumo Kabushiki Kaisha: *See—*
Asakura, Tetsuro; Demura, Makoto; and Kuroo, Takeshi, 4,999,295, Cl. 435-177.000.

Tesch, Gunter. Health pillow. 4,998,309, Cl. 5-434.000.

Tetra Pak Holdings & Finance S.A.: *See—*
Marovskis, Harijs B., 4,998,637, Cl. 220-6.000.

Tetra Pak International AB: *See—*
Rausing, Hans, 4,998,668, Cl. 229-123.100.

Tetzlaff, Wolfgang: *See—*
Braunlich, Peter F.; Tetzlaff, Wolfgang; Hegland, Joel E.; and Jones, Scott C., 4,999,504, Cl. 250-484.100.

Te Velde, Ties S., to U.S. Philips Corporation. Electro-optic display device for use in the reflection mode. 4,999,619, Cl. 340-784.000.

Texas Instruments Incorporated: *See—*
Banerjee, Sanjay K., 4,999,811, Cl. 365-149.000.
Douglas, Monte A., 4,999,320, Cl. 437-225.000.
Hashimoto, Masashi, 4,999,814, Cl. 365-222.000.
Rodder, Mark S., 4,999,690, Cl. 357-23.700.

Thacker, James R.: *See—*
Cohen, Donald M.; and Thacker, James R., 4,998,975, Cl. 128-419.00D.

Thacker, Milton B.; Limburg, John M.; and Memmott, Vincent J. Low profile fluid catalytic cracking apparatus and process. 4,999,100, Cl. 208-155.000.

Thanisch, Klaus J. Retractable turnspout closure. 4,998,649, Cl. 222-507.000.

Thapliyal, Hira V.: *See—*
Eggers, Philip E.; and Thapliyal, Hira V., 4,998,933, Cl. 606-41.000.

Thatcher, David A.; and Tierney, Gordon L., to General Motors Corporation. Entitled vehicle traction control system. 4,998,782, Cl. 303-110.000.

Thayer, William L.: *See—*
Capes, C. Edward; Coleman, Richard D.; Croteau, Joseph L. S.; and Thayer, William L., 4,998,624, Cl. 209-5.000.

Therma-Wave, Inc.: *See—*
Gold, Nathan; Willenborg, David L.; Opsal, Jon; and Rosencwaig, Allan, 4,999,014, Cl. 356-382.000.

Thermabate Limited: *See—*
Glover, John E. S.; and Glover, Timothy N., 4,998,390, Cl. 52-95.000.

Thermadyne, Inc.: *See—*
Ruff, John D., 4,998,417, Cl. 62-532.000.

Thermax Wire Corp.: *See—*
Grimes, William F., Jr.; and Dunn, John A., 4,999,146, Cl. 264-127.000.

Thibodeau, Rodrigue G., to GTE Laboratories Incorporated. Method of forming hybrid arc tubes. 4,999,145, Cl. 264-60.000.

Thielen, Michael J. Golf cart. 4,998,743, Cl. 280-47.260.

Thomas, Anthony J.: *See—*
Kester, Jeffrey A.; Moos, Walter H.; and Thomas, Anthony J., 4,999,430, Cl. 546-105.000.

Thomas Industries Inc.: *See—*
O'Connell, Mark E.; and Rozek, Roy J., 4,998,764, Cl. 294-146.000.

Thomas, Loyd. Fire extinguisher cabinet with sealing means. 4,998,587, Cl. 169-51.000.

Thompson, Charles D., to Motorola, Inc. Generation of a digital correction signal to compensate for gain mismatches in a sigma delta modulator. 4,999,625, Cl. 341-118.000.

Thompson, Lynn C. Knife and sheath. 4,998,350, Cl. 30-151.000.

Thomson-Brandt Armements: *See—*
Denis, Jean F.; Lepicard, Alain; and Ropars, Henri, 4,998,480, Cl. 102-393.000.

Thomson Composants Militaires et Spatiaux: *See—*
Masson, Thierry, 4,999,630, Cl. 341-120.000.

Thomson-CSF: *See*—
Pribat, Didier; and Karapiperis, Leonidas, 4,999,314, Cl. 437-89.000.
Weisbuch, Claude; and Epsztein, Bernard, 4,999,537, Cl. 313-311.000.
Thorn EMI plc: *See*—
Balderson, Simon N.; and Atterbury, Alan R., 4,999,049, Cl. 75-234.000.
Thurber, Neil J. Drainage conduit which is resistant to clogging by beavers. 4,998,847, Cl. 405-127.000.
Tiekink, Jozef J., to Reynolds Aluminium Holland B.V. Method for the permanent mutual connection of already finished metal tubes. 4,998,337, Cl. 29-527.400.
Tierney, Gordon L.: *See*—
Thatcher, David A.; and Tierney, Gordon L., 4,998,782, Cl. 303-110.000.
Tietema, Roel, to Hauzer Holding B.V. High voltage rectifier and associated control electronics. 4,999,760, Cl. 363-53.000.
Tietjens, Eduard W., to U.S. Philips Corp. Cutting unit for a shaving apparatus. 4,998,352, Cl. 30-346.510.
Tikkanen, Tim. No-box system with booster head spray for delivering paper stock to a paper machine. 4,999,088, Cl. 162-317.000.
Toa Nenryo Kogyo Kabushiki Kaisha: *See*—
Doi, Yoshiharu; Soga, Kazuo; and Ueki, Satoshi, 4,999,409, Cl. 526-169.200.
Toda, Kazurou: *See*—
Ishiko, Daisuke; Toda, Kazurou; Kamada, Osamu; and Miura, Akihiro, 4,999,571, Cl. 324-96.000.
Toda, Kohzi. Vibrator-type actuator. 4,999,536, Cl. 310-323.000.
Toda, Soichiro; Hamagishi, Yasutaro; Oki, Toshikazu; and Tomita, Koji, to Bristol-Myers Squibb Co. BU-4164E - A and B, prolyl endopeptidase inhibitors. 4,999,349, Cl. 514-183.000.
Todd, Paul H., Jr., to Kalamazoo Holdings, Inc. Curcumin complexed on water-dispersible substrates. 4,999,205, Cl. 426-250.000.
Todor, John S., Jr.: *See*—
Baldwin, Edward P.; and Todor, John S., Jr., 4,999,152, Cl. 264-555.000.
Tofanetti, Odoardo: *See*—
Gandolfi, Carmelo A.; Frigerio, Marco; Spinelli, Silvano; Tofanetti, Odoardo; and Tognella, Sergio, 4,999,362, Cl. 514-334.000.
Tognella, Sergio: *See*—
Gandolfi, Carmelo A.; Frigerio, Marco; Spinelli, Silvano; Tofanetti, Odoardo; and Tognella, Sergio, 4,999,362, Cl. 514-334.000.
Tohma, Kiyokazu: *See*—
Honda, Kazuyoshi; Sugita, Ryuji; Tohma, Kiyokazu; Kawawake, Yasuihiro; and Murakami, Yoshiki, 4,999,220, Cl. 427-132.000.
Tokai Rubber Industries, Ltd.: *See*—
Funahashi, Yoshiki; Matsumoto, Nobuo; and Shiraki, Keita, 4,998,345, Cl. 29-897.200.
Igarashi, Ichiro; and Ito, Hiroaki, 4,998,564, Cl. 138-126.000.
Tokoro, Setsuo; Watanabe, Tomoyuki; Hayashi, Takashi; and Shigematsu, Takashi, to Toyota Jidosha Kabushiki Kaisha. Speed ratio control system and method for a continuously variable transmission for a vehicle. 4,999,774, Cl. 364-424.100.
Tokura, Mitsuo: *See*—
Onodera, Hiromi; Inaji, Toshio; Yoshiura, Tsukasa; Wakabayashi, Noriaki; Mitani, Hiroshi; and Tokura, Mitsuo, 4,999,558, Cl. 318-685.000.
Tokyo Yogyo Kabushiki Kaisha: *See*—
Yamazaki, Noboru, 4,998,650, Cl. 222-599.000.
Tolvanen, Jyrki: *See*—
Palmu, Jukka; Olinonen, Eero; Numminen, Leo; Tolvanen, Jyrki; and Varis, Martti, 4,999,117, Cl. 210-744.000.
Tomimatsu, Shigenao, to Sanden Corporation. Air conditioning system. 4,998,414, Cl. 62-259.300.
Tomino, Tadashi: *See*—
Uemura, Susumu; Tomino, Tadashi; Tsujioka, Hiroshi; Yoneda, Shigeo; Shindoh, Shigeru; and Yatsuzuka, Yasuhumi, 4,999,617, Cl. 340-706.000.
Tomita, Koji: *See*—
Toda, Soichiro; Hamagishi, Yasutaro; Oki, Toshikazu; and Tomita, Koji, 4,999,349, Cl. 514-183.000.
Tomitani, Tadafumi: *See*—
Goto, Ryo; Tomitani, Tadafumi; Nitanda, Fumio; Toyoda, Manabu; and Ushijima, Makoto, 4,999,726, Cl. 360-120.000.
Tonomura, Akira: *See*—
Osakabe, Nobuyuki; and Tonomura, Akira, 4,998,788, Cl. 350-3.800.
Toor, John W.: *See*—
Stewart, Brian S.; Sacherman, James E.; and Toor, John W., 4,998,362, Cl. 40-152.100.
Toray Industries, Inc.: *See*—
Orino, Shoji; Tanaka, Hiroyosh; and Kuroda, Akiteru, 4,999,245, Cl. 428-374.000.
Toray Silicone Company Ltd.: *See*—
Shimizu, Koji; Yamadera, Toyohiko; and Hamada, Mitsuo, 4,999,131, Cl. 252-314.000.
Torra, Alessandro. Fluent granular material dispenser and applicator. 4,998,674, Cl. 239-652.000.
Torrey, Jonathan G.: *See*—
Salibello, Cosmo; Torrey, Jonathan G.; Coffman, Steven G.; and Murch, Gerald M., 4,998,820, Cl. 351-243.000.
Tosoh Corporation: *See*—
Kamiyama, Katsumi; and Igawa, Kazushige, 4,999,173, Cl. 423-239.000.
Tounai, Syuichi; and Iwanaga, Toshiaki, to Kabushiki Kaisha Yaskawa Denki Seisakusho. Device for supporting arm driving shafts of industrial robot. 4,998,830, Cl. 384-563.000.
Toupin, Joseph F.; and Douesnel, Xavier. Device for detecting the exceeding of a temperature threshold. 4,999,615, Cl. 340-590.000.
Towa Chemical Industry Co., Ltd.: *See*—
Kawashima, Shigeru; Ide, Hiroshi; Kato, Kazuaki; Magara, Mitsuo; and Ishii, Yoshibumi, 4,999,058, Cl. 127-29.000.
Tateno, Yoshiaki; Yoneda, Susumu; Okamoto, Naoki; Ishii, Yoshibumi; and Kato, Kazuaki, 4,999,090, Cl. 203-36.000.
Towle, Ian D. H.; and Horner, Patrick J., to Raychem Limited. Preparation of organic polymers using organometallic capped monomers to produce metal free polymers. 4,999,411, Cl. 528-9.000.
Towne, Raymond A.; Snow, Robert T.; and Preseby, Harry J., to Chrysler Corporation. Mounting arrangement for transmission shift cables. 4,998,446, Cl. 74-473.00R.
Townsend, Blue H., to Gassett, John D.; and Johnson, Paul H., part interest to each. Ring needle pusher. 4,998,651, Cl. 223-101.000.
Townsend, Harold E.: *See*—
Gou, Perng-Fei; and Townsend, Harold E., 4,998,509, Cl. 122-504.000.
Toya, Tomohiro: *See*—
Kaminade, Tadahiro; Iida, Shigeki; Toya, Tomohiro; and Hara, Hajime, 4,999,416, Cl. 528-190.000.
Toynton, Michael A.: *See*—
Doroszkowski, Andrew; Toynton, Michael A.; and Butler, Peter, 4,999,091, Cl. 204-14.100.
Toyo Boseki Kabushiki Kaisha: *See*—
Takenaka, Shigeo, 4,999,279, Cl. 430-781.000.
Toyo Exterior Kabushiki Kaisha: *See*—
Kobayashi, Mitsuru; and Keishirou, Hori, 4,998,577, Cl. 160-202.000.
Toyo Ink Mfg. Co., Ltd.: *See*—
Sakamoto, Mitsutoshi, 4,999,267, Cl. 430-58.000.
Toyoda Gosei Co., Ltd.: *See*—
Kokuryu, Yuji; and Yamaguchi, Hiroshi, 4,998,565, Cl. 138-126.000.
Nozaki, Masahiro, 4,998,946, Cl. 49-497.000.
Shigeki, Terumitsu; and Mizutani, Satoshi, 4,998,692, Cl. 248-56.000.
Toyoda, Manabu: *See*—
Goto, Ryo; Tomitani, Tadafumi; Nitanda, Fumio; Toyoda, Manabu; and Ushijima, Makoto, 4,999,726, Cl. 360-120.000.
Toyota Jidosha Kabushiki Kaisha: *See*—
Tokoro, Setsuo; Watanabe, Tomoyuki; Hayashi, Takashi; and Shigematsu, Takashi, 4,999,774, Cl. 364-424.100.
Tozaki, Katutoshi; and Nakayama, Yoshiaki, to Fuji Photo Film Co., Ltd. Magnetic recorder-reproducer including a one-frame-taking control sequence. 4,999,719, Cl. 360-35.100.
Traitler, Helmut: *See*—
Berger, Manfred; Spielmann, Daniele; and Traitler, Helmut, 4,999,380, Cl. 514-558.000.
Trans Mar, Inc.: *See*—
Campbell, Thomas P., 4,998,986, Cl. 209-44.000.
Trask, Jeffrey L., to Hewlett-Packard Company. Method for enhancing the uniformity and consistency of dot formation produced by color ink jet printing. 4,999,646, Cl. 346-11.000.
Traub, Barry H., to Select Service & Supply Co., Inc. Soft tip football. 4,998,728, Cl. 273-65.0EB.
Tremulis, William S.: *See*—
Samson, Wilfred J.; and Tremulis, William S., 4,998,923, Cl. 606-194.000.
Tresper, Erhard: *See*—
Genz, Joachim; Tresper, Erhard; Idel, Karsten-Josef; Bottenbruch, Ludwig; and Eckhardt, Volker, 4,999,414, Cl. 528-125.000.
Triton Biosciences Inc.: *See*—
Brunck, Terence K.; Larocca, David J.; and Monahan, John J., 4,999,421, Cl. 530-350.000.
Trivedi, Bharat K., to Warner-Lambert Company. Antihyperlipidemic and antiatherosclerotic compounds and compositions. 4,999,373, Cl. 514-437.000.
TRW Inc.: *See*—
Haddock, Loren B.; Ballinger, Bruce D.; and Gelb, George H., 4,999,277, Cl. 430-269.000.
TRW United Carr GmbH & Co.: *See*—
Kraus, Willibald, 4,998,642, Cl. 220-307.000.
Kraus, Willibald, 4,999,019, Cl. 411-512.000.
TRW Vehicle Safety Systems Inc.: *See*—
Vos, Thomas H.; Kumkoski, James M.; Knowlden, Leo S.; and Goetz, George W., 4,999,063, Cl. 149-109.600.
Tsaklakidis, Christos; Leinert, Herbert; and Freund, Peter, to Boehringer Mannheim GmbH. Trisubstituted amines, pharmacologically acceptable salts thereof and pharmaceutical compositions containing them. 4,999,361, Cl. 514-333.000.
Tschernatsch, Gunter, to MAN Gutehoffnungshutte Aktiengesellschaft. Equipment for storing and unstoring bulk material. 4,998,855, Cl. 414-133.000.
Tsinberg, Mikhail: *See*—
Cavallerano, Alan P.; Tsinberg, Mikhail; and Wittig, Karl, 4,999,701, Cl. 358-12.000.
TSL Incorporated: *See*—
Curiel, Yoram, 4,998,989, Cl. 215-250.000.
Tsuchida, Hirofumi: *See*—
Aoki, Norihiko; Tsuchida, Hirofumi; and Ishii, Atsujirou, 4,999,007, Cl. 350-426.000.

Tsuji, Kentaro: *See*—
Fuji, Hiroshi; Maeda, Shigemi; Sakamoto, Noriaki; Terashima, Shigeo; Yamaguchi, Takeshi; Tsuji, Kentaro; and Kojima, Kunio, 4,999,824, Cl. 369-13.000.
Tsuji, Sadahiko; Hamano, Hiroyuki; Mogi, Hirokazu; Ogino, Shigeru; Noguchi, Kazuhiro; and Kobayashi, Takashi, to Canon Kabushiki Kaisha. Image-stabilizing optical device. 4,998,809, Cl. 350-500.000.
Tsuji, Shigeki; Kurata, Yukio; and Yokota, Taizo, to Sharp Kabushiki Kaisha. Image reading apparatus. 4,998,806, Cl. 350-413.000.
Tsujioka, Hiroshi: *See*—
Uemura, Susumu; Tomino, Tadashi; Tsujioka, Hiroshi; Yoneda, Shigeo; Shindoh, Shigeru; and Yatsuzuka, Yasuhumi, 4,999,617, Cl. 340-706.000.
Tsukamoto, Takeo: *See*—
Watanabe, Nobuo; Tsukamoto, Takeo; Takeda, Toshihiko; Ono, Haruhito; and Okunuki, Masahiko, 4,999,083, Cl. 156-628.000.
Tsukiji, Masaaki: *See*—
Ishizuka, Koh; Nishimura, Tetsuharu; Ishii, Satoshi; Kubota, Yoichi; and Tsukiji, Masaaki, 4,998,798, Cl. 350-115.000.
Tsumura, Takashi: *See*—
Morozumi, Eiichi; Tsumura, Takashi; and Inagaki, Hiroyuki, 4,998,561, Cl. 137-630.140.
Tsutsumi, Teruyuki; Sato, Tetsunori; and Arita, Akira, to Teijin Chemicals, Ltd. Method of killing pests. 4,998,377, Cl. 43-125.000.
Tuan, Kenny. Stress-compensated contact element of electrical connector. 4,998,890, Cl. 439-326.000.
Tuchida, Yoichi: *See*—
Murakami, Azuma; Hagiwara, Teruyoshi; Tuchida, Yoichi; and Johno, Hideki, 4,999,461, Cl. 178-19.000.
Tucker, Robert C., Jr.: *See*—
Jackson, John E.; McCaslin, Lynn M.; Stavros, Anthony J.; and Tucker, Robert C., Jr., 4,999,255, Cl. 428-552.000.
Tufts, Donald W., to Board of Governors for Higher Education, State of Rhode Island and Providence Plantations. Signal processing apparatus for generating a fourier transform. 4,999,799, Cl. 364-726.000.
Tugaye, Anne: *See*—
Gourlaouen, Claire; Magnier, Claude; Latourrette, Bertrand; Tugaye, Anne; and Deneuve, Francoise, 4,999,180, Cl. 423-592.000.
Tukada, Hiromi: *See*—
Kitsukawa, Goro; Yanagisawa, Kazumasa; Kawahara, Takayuki; Hori, Ryoichi; Nakagome, Yoshinobu; Hamma, Noriyuki; Itoh, Kiyoo; and Tukada, Hiromi, 4,999,519, Cl. 307-446.000.
Turrini, Silvio; Leonard, Judson S.; and Jouppi, Norman P., to Digital Equipment Corporation. Floating point arithmetic system and method. 4,999,803, Cl. 364-748.000.
Tury, Bernard: *See*—
Richardson, Peter J.; and Tury, Bernard, 4,999,250, Cl. 428-457.000.
Tyler, Stephen G., to General Electric Company, p.l.c., The. Package in the heat dissipation of Electronic devices. 4,999,741, Cl. 361-387.000.
UC Industry Co., Ltd.: *See*—
Nagayoshi, Akio; and Nagayoshi, Kiyoharu, 4,998,563, Cl. 138-122.000.
Uchiyama, Kiyoshi: *See*—
Oshima, Zinichiro; Uchiyama, Kiyoshi; and Nanno, Ikuo, 4,998,859, Cl. 414-680.000.
Udagawa, Tsunekazu, to Ishikawa Gasket Co. Ltd. Metal plate with reinforcing bead and a cylinder head gasket including the same. 4,998,741, Cl. 277-235.00B.
Ueda, Ryuichi; Nakamura, Masaaki; Iwasaki, Toshio; Hirota, Kanji; and Nakamura, Tetsuya, to Fujitsu Limited. Monitoring system using infrared image processing. 4,999,614, Cl. 340-588.000.
Uede, Hisashi: *See*—
Inada, Shuji; Ohba, Toshihiro; Kishishita, Hiroshi; and Uede, Hisashi, 4,999,618, Cl. 340-781.000.
Uehara, Masao: *See*—
Matsui, Isamu; Uehara, Masao; Sakai, Shoji; Noda, Koshi; and Kubota, Yasuhiko, 4,998,407, Cl. 57-328.000.
Ueki, Satoshi: *See*—
Doi, Yoshiharu; Soga, Kazuo; and Ueki, Satoshi, 4,999,409, Cl. 526-169.200.
Uematsu, Yoshihiro; Shimizu, Isami; and Hiramatsu, Naoto, to Nisshin Steel Company, Ltd. Heat-resistant austenitic stainless steel. 4,999,159, Cl. 420-53.000.
Uemura, Susumu; Tomino, Tadashi; Tsujioka, Hiroshi; Yoneda, Shigeo; Shindoh, Shigeru; and Yatsuzuka, Yasuhumi, to Sharp Kabushiki Kaisha. Device for reading patterns displayed on a display unit. 4,999,617, Cl. 340-706.000.
Ueno, Atsushi; and Suzuki, Takao, to Sharp Kabushiki Kaisha. Interlocked zooming apparatus for use in stereoscopic cameras. 4,999,713, Cl. 358-225.000.
Ueno, Fuminori; and Ohsawa, Yutaka, to Asahi Kogaku Kogyo Kabushiki Kaisha. Camera having selective functions. 4,999,661, Cl. 354-402.000.
Ueno, Hiroshi: *See*—
Yoshida, Teruo; and Ueno, Hiroshi, 4,999,394, Cl. 524-514.000.
Ueno, Keiji; and Saen, Haruo, to Sumitomo Electric Industries, Ltd. Manufacturing method for plastic optical fiber. 4,999,141, Cl. 264-1.400.
Uetsuki, Masao: *See*—
Nishida, Yasuaki; Fujisawa, Katsuya; Fujita, Yoshihiro; Fujiwara, Masao; Yoshikawa, Shigeo; and Uetsuki, Masao, 4,998,800, Cl. 350-162.200.
Ueyama, Masanori: *See*—
Sano, Masanori; Ueyama, Masanori; and Watanabe, Kenji, 4,999,543, Cl. 315-169.300.
Ueyama, Michio: *See*—
Ishiwata, Shinichi; Ueyama, Michio; Nakae, Hiroyuki; Funayama, Yoshiyuki; Iwamoto, Kazushige; and Noguchi, Isamu, 4,999,242, Cl. 428-345.000.
UFI, Inc.: *See*—
Miksitz, Frank J., 4,998,596, Cl. 180-213.000.
Ultramatic Embroidery Machine Company: *See*—
Golia, Kenneth R., 4,998,964, Cl. 112-121.120.
Umezono, Shiro; and Maki, Minoru, to Nippon Gear Co., Ltd. Method of modified gear cutting of a globoid worm gear. 4,998,385, Cl. 51-287.000.
Unimed, Inc.: *See*—
Hannah, Ralph E., 4,998,915, Cl. 604-73.000.
Union Carbide Chemicals and Plastics Company Inc.: *See*—
Bunning, Donald L.; Etzkorn, William G.; Haydon, William M.; Harkreader, Gordon G.; Kurland, Jonathan J.; Liu, Wai C.; and Vera-Castaneda, Ernesto, 4,999,452, Cl. 560-208.000.
Kao, Sun-Chueh; and Karol, Frederick J., 4,999,327, Cl. 502-119.000.
Moody, Lawrence G.; Childress, Thomas E.; Pitrolo, Robert L.; Ritscher, James S.; and Leichliter, Ronald P., 4,999,446, Cl. 556-470.000.
Neale, Robert S.; and Schilling, Curtis L., Jr., 4,999,412, Cl. 528-28.000.
Union Carbide Coatings Service Technology Corporation: *See*—
Jackson, John E.; McCaslin, Lynn M.; Stavros, Anthony J.; and Tucker, Robert C., Jr., 4,999,255, Cl. 428-552.000.
Union Carbide Industrial Gases Technology Corporation: *See*—
Burr, William J., 4,998,954, Cl. 73-863.580.
Pelton, John F., 4,998,710, Cl. 266-286.000.
Union Financiers pour le Developpement de l'Economie Cerealiere - Unigrains: *See*—
Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; and Leclere, Jean, 4,998,322, Cl. 452-71.000.
Uniroyal Goodrich Tire Company, The: *See*—
Hublikar, Sudhendra V.; and Kinaitis, Leonard G., 4,998,825, Cl. 374-50.000.
Unisys Corporation: *See*—
Dzarnoski, John E., Jr.; and Babcock, James W., 4,999,311, Cl. 437-51.000.
Froloff, Philip P., 4,999,023, Cl. 439-68.000.
United Kingdon Atomic Energy Authority: *See*—
Wilson, Eric G., 4,999,052, Cl. 75-338.000.
United States of America
Air Force: *See*—
Koslover, Robert A.; Cremer, Charles D.; Geren, William P.; Voss, Donald E.; and Miner, Lynn M., 4,999,591, Cl. 333-21.00R.
Seipelt, Christopher, 4,999,552, Cl. 318-434.000.
Army: *See*—
Jett-Tilton, Marti; and Alving, Carl R., 4,999,344, Cl. 514-77.000.
Mariani, Elio A.; and Hartmann, Clinton S., 4,999,535, Cl. 310-313.00B.
Schmidt, Edward M.; and Donovan, William F., 4,998,994, Cl. 244-3.100.
Vincent, Philip M.; Chang, Albert L.; and Martorell, Ivan A., 4,999,793, Cl. 364-569.000.
United States of America as represented by the Secretary of the Air Force: *See*—
Waldrop, James R.; and Grant, Ronald W., 4,999,685, Cl. 357-15.000.
National Aeronautics and Space Administration: *See*—
Seraji, Homayoun, 4,999,553, Cl. 318-561.000.
Sheridan, Philip L., 4,998,842, Cl. 403-252.000.
Navy: *See*—
Dale, John R.; and Holler, Roger A., 4,999,816, Cl. 367-4.000.
Silvia, Denis A., 4,998,963, Cl. 102-275.900.
U.S. Philips Corporation: *See*—
Autier, Philippe; Erman, Marko; and Auger, Jean-Marc, 4,999,686, Cl. 357-16.000.
Borgions, Willem J., 4,998,618, Cl. 206-307.000.
Bourcier, Henri; and Doittau, Francois X., 4,999,548, Cl. 315-370.000.
Deville, Yannick, 4,999,522, Cl. 307-520.000.
Evans, David H., 4,999,587, Cl. 331-107.0DP.
Gentner, Jean-Louis; Patillon, Jean-Noel; Mallet-Mouko, Catherine; and Martin, Gerard, 4,999,696, Cl. 357-30.000.
Kinghorn, John R., 4,999,706, Cl. 358-147.000.
Klee, Mareike K.; and Brand, Hans-Wolfgang, 4,999,181, Cl. 423-608.000.
Lapre, Marcella A.; and Friederichs, Winand H. A. M., 4,999,538, Cl. 313-318.000.
L'hermite, Pierre, 4,999,540, Cl. 313-533.000.
Paulin, Jacques, 4,999,711, Cl. 358-169.000.
Pichlik, Herbert, 4,999,624, Cl. 341-118.000.
Pollen, Rudy W. J.; and Bierhoff, Martinus P. M., 4,999,828, Cl. 369-59.000.
Raaymakers, Wilhelmus P. M.; and Kuijpers, Franciscus L. J. M., 4,999,825, Cl. 369-44.260.
Te Velde, Ties S., 4,999,619, Cl. 340-784.000.
Tietjens, Eduard W., 4,998,352, Cl. 30-346.510.
Wolfs, Marc J. M.; and Garenfeld, Andreas J., 4,998,460, Cl. 92-162.00R.

United Technologies Automotive: *See*—
Lawassani, Abdi R.; and Wasik, Mark J., 4,998,767, Cl. 296-97.100.
United Technologies Corporation: *See*—
Prewo, Karl M.; Nardone, Vincent C.; and Strife, James R., 4,999,256, Cl. 428-552.000.
United Telecommunications, Inc.: *See*—
Grace, Martin K., 4,999,831, Cl. 370-50.000.
Univ. of North Carolina at Chapel Hill, The: *See*—
Izydore, Robert A.; and Hall, Iris H., 4,999,366, Cl. 514-380.000.
Universal Data Systems, Inc.: *See*—
Blankenship, Lowel E., 4,999,744, Cl. 361-415.000.
Universal Golf Supply, Inc.: *See*—
Meyer, David P., 4,998,734, Cl. 273-235.00R.
Universal Product Innovations, Inc.: *See*—
Garner, Harold E.; Miller, Merrill M.; Kavanagh, Brian E.; and Spring, Gorden W., 4,998,902, Cl. 446-2.000.
Universite du Quebec a Trois-Rivieres: *See*—
Bose, Tapan K.; Chahine, Richard; and St-Arnaud, Jean-Marie, 4,999,330, Cl. 502-402.000.
University of Alberta, The Governors of the: *See*—
Ristic, Ljubisa; Baltes, Heinrich P.; and Smy, Thomas, 4,999,692, Cl. 357-27.000.
University of California, The Regents of the: *See*—
White, David L.; Engelstad, Barry L.; and Muetterties, Kurt A., 4,999,445, Cl. 556-138.000.
University of Georgia Research Foundation, Inc.: *See*—
Glisson, John R.; and Hofacre, Charles L., 4,999,191, Cl. 424-92.000.
University of Kentucky Research Foundation: *See*—
Zavos, Panayiotis M.; and Dawson, Karl A., 4,999,283, Cl. 435-2.000.
University of Minnesota, Regents of the: *See*—
Barton, Marlene R., 4,999,300, Cl. 435-252.340.
Xu, Jingming; Shur, Michael; and Sweeny, Mark, 4,999,682, Cl. 357-4.000.
University of Southern Mississippi: *See*—
Mathias, Lon J.; and Kusefoglu, Selim H., 4,999,410, Cl. 526-318.300.
University of Tennessee Research Corporation: *See*—
Ashbee, Kenneth H. G., 4,999,156, Cl. 419-5.000.
Urai, Masahiko: *See*—
Iguchi, Katsuji; Urai, Masahiko; and Masuichi, Chiyako, 4,999,689, Cl. 357-23.600.
Urbach, Hansjorg: *See*—
Ruger, Wolfgang; Urbach, Hansjorg; Henning, Rainer; Stechl, Jens; Usinger, Patricia; and Hock, Franz, 4,999,370, Cl. 514-412.000.
Usami, Mitsuo; Shiozawa, Noboru; Yamada, Toshio; Katoh, Hiromasa; Satoh, Kazuyoshi; Kobayashi, Tohru; Kimura, Tatsuya; Hamamoto, Masato; Shimizu, Atsushi; and Koyu, Kaoru, to Hitachi, Ltd. High speed TTL buffer circuit which is resistive to the influence of alpha-rays. 4,999,520, Cl. 307-456.000.
Usami, Toshimasa; Hatakeyama, Seiji; Shimomura, Akihiro; and Iwakura, Ken, to Fuji Photo Film Co., Ltd. Heat sensitive recording material. 4,999,333, Cl. 503-209.000.
Ushijima, Makoto: *See*—
Goto, Ryo; Tomitani, Tadafumi; Nitanda, Fumio; Toyoda, Manabu; and Ushijima, Makoto, 4,999,726, Cl. 360-120.000.
Ushiro, Tatsuzo: *See*—
Kozuki, Susumu; Ushiro, Tatsuzo; Masui, Toshiyuki; Takei, Masahiro; and Nagasawa, Kenichi, 4,999,722, Cl. 360-77.150.
Usinger, Patricia: *See*—
Kampe, Klaus-Dieter; Usinger, Patricia; Siegel, Herbert; Alpermann, Hans G.; and Gerhards, Hermann J., 4,999,352, Cl. 514-235.800.
Ruger, Wolfgang; Urbach, Hansjorg; Henning, Rainer; Stechl, Jens; Usinger, Patricia; and Hock, Franz, 4,999,370, Cl. 514-412.000.
Usova, Alexandra V.: *See*—
Solodovnik, Valentin D.; Solodkaya, Tatyana I.; Litvinova, Maria T.; Meshkova, Taisa A.; Usova, Alexandra V.; and Davydov, Anatoly B., 4,999,188, Cl. 424-78.000.
Utica Enterprises, Inc.: *See*—
Dacey, Ernest A., Jr., 4,998,332, Cl. 29-90.010.
Uzawa, Tsutomu; Ishii, Atsujiro; and Aoki, Norihiko, to Olympus Optical Co., Ltd. Variable focal length lens system. 4,998,807, Cl. 350-423.000.
Vacu-Purg, Inc.: *See*—
Rogers, Ronald J., 4,998,554, Cl. 137-217.000.
Vaillancourt, Vincent L. Needle connector. 4,998,713, Cl. 604-283.000.
Vaillancourt, Vincent L. Connector. 4,998,927, Cl. 604-283.000.
Vaisala OX: *See*—
Jappinen, Kalervo A.; Hakala, Marja-Riitta; Jalava, Jouko S.; and Lehto, Ari, 4,998,431, Cl. 73-1.00G.
Valimont, James L.: *See*—
Freeman, Glenn E.; Valimont, James L.; Dunaway, James H.; and Korenkiewicz, Karen J., 4,998,784, Cl. 350-3.700.
Valovich, David J.: *See*—
Labinger, Richard; Macri, Timothy F.; Yoder, Paul R., Jr.; and Valovich, David J., 4,998,819, Cl. 351-212.000.
Van Doorne's Transmissie B.V.: *See*—
Cuypers, Martinus H., 4,998,908, Cl. 474-245.000.
Van Avermaete, Gilbert L. Ch. H. L. Compression ignition engine with variable swept volume. 4,998,511, Cl. 123-48.00B.
van Bavel, Nicholas R.: *See*—
McCaslin, Shawn R.; and van Bavel, Nicholas R., 4,999,798, Cl. 364-724.100.
van den Bergh, Hubert; and Wagnieres, Georges, to Ciba-Geigy Corporation. Optical waveguide plug connection. 4,998,797, Cl. 350-96.210.
Vanderminnen, Martin: *See*—
Mawer, Eric L.; Vanderminnen, Martin; Willans, Robert D. H.; Graham, Michael; and Manwell, Robert E., 4,998,579, Cl. 164-130.000.
Vander Togt, Robbert T. Bumper and process to bond ionomers to plastic. 4,999,227, Cl. 428-31.000.
van Gompel, Remi: *See*—
Vansant, Etienne; Peeters, Guido; de Bievre, Paul; and van Gompel, Remi, 4,999,175, Cl. 423-244.000.
Van Order, Kim L.; Wright, Kevin L.; and Smith, Nels R., to Prince Corporation. Sliding visor. 4,998,765, Cl. 296-97.110.
VanRossen, Edward C.: *See*—
Johnson, Roger E.; Jensen, Thomas C.; VanRossen, Edward C.; and O'Donnell, Kevin M., 4,998,769, Cl. 296-183.000.
Vansant, Etienne; Peeters, Guido; de Bievre, Paul; and van Gompel, Remi, to European Atomic Energy Community (EURATOM). Process for selective adsorption of sulfur compounds from gaseous mixtures containing mercaptans. 4,999,175, Cl. 423-244.000.
Van Steenburgh, Leon R., Jr. Refrigerant reclaim method and apparatus. 4,998,416, Cl. 62-292.000.
Varian Associates, Inc.: *See*—
Wells, Gregory J.; and Berg, John R., 4,999,162, Cl. 422-54.000.
Varis, Martti: *See*—
Palmu, Jukka; Olinonen, Eero; Numminen, Leo; Tolvanen, Jyrki; and Varis, Martti, 4,999,117, Cl. 210-744.000.
Varney, Albert R., Jr.: *See*—
Bickford, Dale M.; Farnsworth, Richard G.; Hardy, Samuel G.; Hawley, John R.; and Varney, Albert R., Jr., 4,999,572, Cl. 342-103.00R.
Varum, Shirley B. Tooth cleaning strip. 4,998,978, Cl. 132-321.000.
Vaux, Thomas M. Impact-absorbing safety matting system for a helipad. 4,998,717, Cl. 272-3.000.
Vecchietti, Vittorio; and Giardina, Giuseppe, to Dr. Lo Zambeletti S.p.A. Heterocyclic ethylene diamine compounds and their pharmaceutical compositions and methods. 4,999,359, Cl. 514-301.000.
Velasco Scale Company: *See*—
Reeves, Robert H., Jr.; Cox, Charles R.; and Montes, Hilario, 4,998,911, Cl. 493-108.000.
Velino Ventures Inc.: *See*—
Farrar, David H., 4,998,876, Cl. 431-3.000.
Vera-Castaneda, Ernesto: *See*—
Bunning, Donald L.; Etzkorn, William G.; Haydon, William M.; Harkreader, Gordon G.; Kurland, Jonathan J.; Liu, Wai C.; and Vera-Castaneda, Ernesto, 4,999,452, Cl. 560-208.000.
Verdot, Georges. Four state phase shift modulator, in particular for amplitude modulation of two carriers in quadrature with a large number of states. 4,999,590, Cl. 332-104.000.
Vereinigte Aluminum-Werke Aktiendesellschaft: *See*—
Brown, Neil, 4,999,170, Cl. 423-112.000.
Vernon, Della M. Hair treatment composition and method. 4,999,187, Cl. 424-70.000.
Verteq, Inc.: *See*—
Bran, Mario E., 4,998,549, Cl. 134-184.000.
Verzilli, Giuseppe: *See*—
Staheli, Paul; and Verzilli, Giuseppe, 4,998,325, Cl. 19-106.00R.
Vestec Corporation: *See*—
Allen, Mark; and Lewis, Ivor A. S., 4,999,493, Cl. 250-288.000.
Veys, Jeff M. Bucket-blade attachment for tractors. 4,999,022, Cl. 414-718.000.
Vickers PLC: *See*—
Etherington, Terence; Fletcher, Keith M.; Potts, Rodney M.; and Wade, John R., 4,999,271, Cl. 430-284.000.
Vickroy, Harold C.; and Zera, Nancy. Intermittent I.V. therapy needle sheath. 4,998,921, Cl. 604-167.000.
Victor Company of Japan, Ltd.: *See*—
Ando, Ichiro, 4,999,704, Cl. 358-133.000.
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; Furuya, Masato; and Suzuki, Tetsuji, 4,999,712, Cl. 358-213.110.
Vidra, Laszlo : *See*—
Soos, Rudolf; Nemes, Jozsef; Szelestei, Miklos; Schler, Istvan; Vidra, Laszlo ; and Szekely, Istvan, 4,999,454, Cl. 560-213.000.
Vieau, Daniel: *See*—
Bocquet, Jean-Pierre; and Vieau, Daniel, 4,999,224, Cl. 427-356.000.
Vijayendran, Bheema R.: *See*—
Iacoviello, John G.; Davidowich, George; Vijayendran, Bheema R.; and Sadowski, John S., 4,999,239, Cl. 428-288.000.
Vilaine, Jean-Paul: *See*—
Regnier, Gilbert; Dhainaut, Alain; Vilaine, Jean-Paul; Villeneuve, Nicole; Joly, Ghislaine; and Duhault, Jacques, 4,999,372, Cl. 514-422.000.
Vilims, Daniel E., to Rhee, Chuen J. Picture/poster frame assembly and retainer for holding components in the frame of the assembly. 4,998,363, Cl. 40-156.000.
Villemin, Daniel; Plusa, Janusz; Guilbaud, Daniel; and Leclere, Jean, to Etablissements Arrive S.A.; and Union Financiers pour le Developpement de l'Economie Cerealiere - Unigrains. System for dewinging fowl. 4,998,322, Cl. 452-71.000.

Villeneuve, Nicole: *See*—
Regnier, Gilbert; Dhainaut, Alain; Vilaine, Jean-Paul; Villeneuve, Nicole; Joly, Ghislaine; and Duhault, Jacques, 4,999,372, Cl. 514-422.000.

Vincent, Philip M.; Chang, Albert L.; and Martorell, Ivan A., to United States of America, Army. Microcomputer real-time flash x-ray controller for data acquisition. 4,999,793, Cl. 364-569.000.

Vink, Timothy; Burkholder, Robert F.; D'Aleo, Michael J.; Elsbury, Andrew; Flowers, Woodie; Lordo, Richard; and McCall, Shawn R., to Lutron Electronics Co., Inc. Mounting frame for ganged electrical devices. 4,998,635, Cl. 220-3.400.

Vo-Dinh, Tuan, to Martin Marietta Energy Systems, Inc. Surface-enhanced raman optical data storage system. 4,999,810, Cl. 365-124.000.

Vodrazka, Wolfgang: *See*—
Lueth, Gero; Becker, Rolf; Horn, Robert K.; Kempe, Uwe; and Vodrazka, Wolfgang, 4,999,029, Cl. 48-197.00R.

Voest-Alpine Maschinenbau Gesellschaft m.b.H.: *See*—
Schetina, Otto; Kissich, Arnulf; Stecher, Werner; Habenicht, Helmut; Papst, Wilhelm; and Pleterski, Bernhard, 4,998,777, Cl. 299-67.000.

Vogel, James C.; and Merritt, Christopher R., to Ransburg Corporation. Twin velocity localized collection head. 4,998,501, Cl. 118-312.000.

Vogel, Richard M.; and Milton, Mitchell J., to Eastman Kodak Company. Still video camera having video synchronized to drive motor phase. 4,999,714, Cl. 358-337.000.

Voggenreiter, Harald: *See*—
Werner, Bernd; and Voggenreiter, Harald, 4,998,750, Cl. 280-740.000.

Vohringer, Fritz, to F. Oberdorfer GmbH & Co. KG Industriegewebe-Technik. Double layered papermaking fabric with high paper side cross thread density. 4,998,568, Cl. 139-383.00A.

Voropai, Nikolai M.: *See*—
Paton, Boris E.; Voropai, Nikolai M.; Nikiforov, Boris A.; Schegolev, Georgy A.; Logiiko, Gennady P.; and Mischanin, Vasily G., 4,999,479, Cl. 219-145.220.

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Wustefeld, Walter. SRB and external tank stabilizing system. 4,998,690, Cl. 244-158.00R.
Xenex Corporation: *See—*
Werjefelt, Bertil, 4,998,529, Cl. 128-201.130.
Xenex Systems Limited Partnership I: *See—*
Werjefelt, Bertil, 4,998,529, Cl. 128-201.130.
Xerox Corporation: *See—*
Bares, Jan, 4,999,673, Cl. 355-208.000.
Corbin, Robert W.; Detwiler, William E.; and Kolb, Steven E., 4,999,679, Cl. 355-303.000.
Drake, Donald J.; Campanelli, Michael R.; Burke, Cathie J.; and Atkinson, Diane, 4,999,077, Cl. 156-299.000.
Xie, Ya-Hong: *See—*
Luryi, Sergey; and Xie, Ya-Hong, 4,999,843, Cl. 372-45.000.
Xu, Jingming; Shur, Michael; and Sweeny, Mark, to University of Minnesota, Regents of the. Electronic and optoelectronic laser devices utilizing light hole properties. 4,999,682, Cl. 357-4.000.
Xu, Qichang C.: *See—*
Newnham, Robert E.; Xu, Qichang C.; and Yoshikawa, Shoko, 4,999,819, Cl. 367-157.000.
Yabe, Masao: *See—*
Inagaki, Yoshio; Adachi, Keiichi; and Yabe, Masao, 4,999,281, Cl. 430-495.000.
Yabe, Shinichi: *See—*
Nebashi, Tutomu; Yabe, Shinichi; Yamaguchi, Nobuyoshi; Takizawa, Shuichi; and Sai, Fumio, 4,999,138, Cl. 252-543.000.
Yabu, Shuichi: *See—*
Ohta, Masakatsu; Yabu, Shuichi; and Murakami, Junichi, 4,998,821, Cl. 353-122.000.
Yafuso, Masao; and Hui, Henry K., to Minnesota Mining and Manufacturing Company. Composition, apparatus and method for sensing ionic components. 4,999,306, Cl. 436-68.000.
Yakushiji, Akira, to Sharp Kabushiki Kaisha. Electronic device for reducing the power consumption during the supply of back up power. 4,999,794, Cl. 364-707.000.
Yamada, Katsumi: *See—*
Nishiura, Masaharu; and Yamada, Katsumi, 4,999,308, Cl. 437-4.000.
Yamada, Takahiro; Kurahashi, Kazuyoshi; and Watanabe, Shyuji, to Asmo Co., Ltd.; Nippondenso Co., Ltd; and Daihatsu Motor Co., Ltd. Vehicle window regulator. 4,998,379, Cl. 49-138.000.
Yamada, Takahiro, to Matsushita Electric Industrial Co., Ltd. Superconductive transistor. 4,999,337. Cl. 505-1.000.
Yamada, Toshio: *See—*
Usami, Mitsuo; Shiozawa, Noboru; Yamada, Toshio; Katoh, Hiromasa; Satoh, Kazuyoshi; Kobayashi, Tohru; Kimura, Tatsuya; Hamamoto, Masato; Shimizu, Atsushi; and Koyu, Kaoru, 4,999,520, Cl. 307-456.000.
Yamada, Yoko: *See—*
Nohira, Hiroyuki; Kimura, Takashi; Abe, Tetsuya; Yamada, Yoko; and Yamagishi, Kazuhige, 4,999,130, Cl. 252-299.010.
Yamadera, Toyohiko: *See—*
Shimizu, Koji; Yamadera, Toyohiko; and Hamada, Mitsuo, 4,999,131, Cl. 252-314.000.
Yamagishi, Kazuhige: *See—*
Nohira, Hiroyuki; Kimura, Takashi; Abe, Tetsuya; Yamada, Yoko; and Yamagishi, Kazuhige, 4,999,130, Cl. 252-299.010.
Yamaguchi, Hiroshi: *See—*
Kokuryu, Yuji; and Yamaguchi, Hiroshi, 4,998,565, Cl. 138-126.000.
Yamaguchi, Nobuyoshi: *See—*
Nebashi, Tutomu; Yabe, Shinichi; Yamaguchi, Nobuyoshi; Takizawa, Shuichi; and Sai, Fumio, 4,999,138, Cl. 252-543.000.
Yamaguchi, Seiji: *See—*
Fukuyasu, Shigeki; Nakamura, Makoto; Kawachi, Kyozo; Yamaguchi, Seiji; Kinoshita, Sakan; and Numata, Tadashi, 4,999,203, Cl. 426-46.000.
Yamaguchi, Shotaro: *See—*
Akiba, Tetsunori; Yamaguchi, Shotaro; Suzuki, Satoru; Isobe, Kimiyasu; and Matsunaga, Kuniyoshi, 4,999,289, Cl. 435-19.000.
Yamaguchi, Takeshi: *See—*
Fuji, Hiroshi; Maeda, Shigemi; Sakamoto, Noriaki; Terashima, Shigeo; Yamaguchi, Takeshi; Tsuji, Kentaro; and Kojima, Kunio, 4,999,824, Cl. 369-13.000.

Yamaguchi, Teruzo; and Morita, Tatsuo, to Obara Corporation. Resistance measuring mechanism in a resistance welding machine. 4,999,477, Cl. 219-110.000.
Yamaguchi, Yoshinori, to Kawasaki Jukogyo Kabushiki Kaisha. Small watercraft. 4,998,966, Cl. 114-270.000.
Yamaha Corporation: *See*—
Kakubo, Yuji; and Sotome, Hiromi, 4,999,628, Cl. 341-139.000.
Suzuki, Hideo; Matsushima, Shunichi; Obata, Masahiko; and Sakama, Masao, 4,998,457, Cl. 84-600.000.
Yamaha Hatsudoki Kabushiki Kaisha: *See*—
Masuda, Tatsuyuki; and Ozawa, Toshikazu, 4,998,512, Cl. 123-65.0PE.
Yamakawa Chemical Industry Co., Ltd.: *See*—
Nohira, Hiroyuki; Kimura, Takashi; Abe, Tetsuya; Yamada, Yoko; and Yamagishi, Kazuhige, 4,999,130, Cl. 252-299.010.
Yamamoto, Etsuji: *See*—
Nakase, Noriaki; Hokkedo, Mamoru; Yamamoto, Etsuji; Yoshida, Masahiko; and Kitayama, Yuyaka, 4,999,089, Cl. 196-110.000.
Yamamoto, Mayjue A., to General Motors Corporation. Drum brake shoe hold-down and retraction spring and anchor post therefor. 4,998,602, Cl. 188-328.000.
Yamamoto, Sumio; and Sakurai, Shinichi, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Methacrylic acid ester resin composition. 4,999,402, Cl. 525-305.000.
Yamamoto, Susumu: *See*—
Nakanishi, Shingo; and Yamamoto, Susumu, 4,998,865, Cl. 417-423.700.
Yamamoto, Takemi; and Higashiyama, Shunichi, to Brother Kogyo Kabushiki Kaisha. Photo and pressure sensitive recording medium. 4,999,331, Cl. 503-200.000.
Yamamoto, Toshimasa, to Kabushiki Kaisha Toaki-Rika-Denki-Seisakusho. Webbing drive apparatus for a seat belt system. 4,998,680, Cl. 242-54.00R.
Yamamoto, Yoshimi: *See*—
Yuzuriha, Naoki; and Yamamoto, Yoshimi, 4,998,999, Cl. 280-777.000.
Yamanaka, Takashi, to Tanashin Denki Co., Ltd. Magnetic recording and reproducing device having a cassette loading mechanism driven by a pinch roller. 4,999,723, Cl. 360-96.500.
Yamanoi, Yukio; Kandachi, Mitsuo; Iwata, Masahiro; and Kato, Kazumi, to Furukawa Aluminum Co., Ltd. Method for drawing tubular material. 4,998,429, Cl. 72-283.000.
Yamashita, Haruo: *See*—
Saji, Yoshito; Namoto, Yoshiteru; Mushika, Yoshihiro; and Yamashita, Haruo, 4,999,649, Cl. 346-134.000.
Yamashita, Toshio: *See*—
Fudono, Kanji; Ogawa, Hiroshi; Takahashi, Toshimasa; and Yamashita, Toshio, 4,998,582, Cl. 165-11.100.
Yamatake-Honeywell Co. Ltd.: *See*—
Morozumi, Eiichi; Tsumura, Takashi; and Inagaki, Hiroyuki, 4,998,561, Cl. 137-630.140.
Yamazaki, Etsuo; and Nagata, Hiroo, to Fanuc Ltd. Digitizing method. 4,999,555, Cl. 318-578.000.
Yamazaki, Hiroshi; and Okazaki, Sakae, to Sony Corporation. Apparatus for inserting title pictures. 4,999,709, Cl. 358-160.000.
Yamazaki, Noboru, to Nippon Rotary Nozzle Co., Ltd.; NKK Corporation; Kokan Kikai Kogyo Kabushiki Kaisha; and Tokyo Yogyo Kabushiki Kaisha. Rotary nozzle on a molten steel vessel. 4,998,650, Cl. 222-599.000.
Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Printing member for electrostatic photocopying. 4,999,270, Cl. 430-67.000.
Yamazaki, Shunpei; Mase, Akira; and Hamatani, Toshiji, to Semiconductor Energy Laboratory Co., Ltd. Photoelectric conversion device with a high response speed. 4,999,693, Cl. 357-30.000.
Yamazaki, Toru, to NEC Corporation. Inverter circuit. 4,999,517, Cl. 307-446.000.
Yanagisawa, Kazumasa: *See*—
Kitsukawa, Goro; Yanagisawa, Kazumasa; Kawahara, Takayuki; Hori, Ryoichi; Nakagome, Yoshinobu; Hamma, Noriyuki; Itoh, Kiyoo; and Tukada, Hiromi, 4,999,519, Cl. 307-446.000.
Yang, Keun Y., to Goldstar Co, Ltd. Optical scanning system for a bar code reader. 4,999,482, Cl. 235-457.000.
Yankosky, James A.: *See*—
Barth, John E., Jr.; Drake, Charles E.; Hovis, William P.; Kalter, Howard L.; Kelley, Gordon A., Jr.; Lewis, Scott C.; Nickel, Daniel J.; and Yankosky, James A., 4,999,815, Cl. 365-230.060.
Yano, Kazuyuki: *See*—
Fukuzawa, Sooichi; and Yano, Kazuyuki, 4,998,861, Cl. 415-206.000.
Yasuge, Katsumi, to Fuji Jukogyo Kabushiki Kaisha. Detecting system of electrode tips for a spot welder. 4,999,475, Cl. 219-86.410.
Yasui, Yoshiyuki: *See*—
Karnopp, Dean C.; and Yasui, Yoshiyuki, 4,998,593, Cl. 180-140.000.
Yasutake, Masatoshi: *See*—
Miyata, Chikara; Yasutake, Masatoshi; and Ishijima, Hiroshi, 4,999,495, Cl. 250-306.000.
Yates, David: *See*—
Snare, Margaret J.; Yates, David; and Sanders, Ross, 4,999,062, Cl. 149-2.000.
Yatsuzuka, Yasuhumi: *See*—
Uemura, Susumu; Tomino, Tadashi; Tsujioka, Hiroshi; Yoneda, Shigeo; Shindoh, Shigeru; and Yatsuzuka, Yasuhumi, 4,999,617, Cl. 340-706.000.
Yazaki Corporation: *See*—
Sugimoto, Yoshinobu; Mizuguchi, Yoshifumi; and Hoshino, Yoshinobu, 4,999,247, Cl. 428-383.000.
Suzuki, Yoshiyuki; Aoki, Kunimitsu; and Iino, Tadashi, 4,999,011, Cl. 353-14.000.
Suzuki, Yoshiyuki; Aoki, Kunimitsu; and Iino, Tadashi, 4,999,012, Cl. 353-14.000.
Yazaki Electric Wire Co., Ltd.: *See*—
Sugimoto, Yoshinobu; Mizuguchi, Yoshifumi; and Hoshino, Yoshinobu, 4,999,247, Cl. 428-383.000.
Yeda Research & Development Co., Ltd.: *See*—
Breskin, Amos; and Chechik, Rachel, 4,999,500, Cl. 250-385.100.
Friesem, Asher A.; and Amitai, Yaakov, 4,998,786, Cl. 350-3.700.
Yeh, Pin Yen, to Lin, Cheng Chen. Structure of lateral driving device for car. 4,998,595, Cl. 180-202.000.
Yener, Mehmet U.: *See*—
Platzer, Stephan J. W.; Yener, Mehmet U.; and Wanat, Stanley F., 4,999,266, Cl. 430-14.000.
Yin, Simon, to Square D Company. Arc stalling eliminating device and system. 4,999,463, Cl. 200-144.00B.
Yoder, Paul R., Jr.: *See*—
Labinger, Richard; Macri, Timothy F.; Yoder, Paul R., Jr.; and Valovich, David J., 4,998,819, Cl. 351-212.000.
Yokohama Rubber Co., Ltd., The: *See*—
Kanamaru, Masahiko, 4,998,575, Cl. 152-540.000.
Yokota, Taizo: *See*—
Tsuji, Shigeki; Kurata, Yukio; and Yokota, Taizo, 4,998,806, Cl. 350-413.000.
Yolton, Charles F.; Lizzi, Thomas; and Moll, John H., to Crucible Materials Corporation. System and method for atomizing a titanium-based material. 4,999,051, Cl. 75-338.000.
Yoneda, Shigeo: *See*—
Uemura, Susumu; Tomino, Tadashi; Tsujioka, Hiroshi; Yoneda, Shigeo; Shindoh, Shigeru; and Yatsuzuka, Yasuhumi, 4,999,617, Cl. 340-706.000.
Yoneda, Susumu: *See*—
Tateno, Yoshiaki; Yoneda, Susumu; Okamoto, Naoki; Ishii, Yoshibumi; and Kato, Kazuaki, 4,999,090, Cl. 203-36.000.
Yonehara, Takao: *See*—
Arikawa, Shiro; and Yonehara, Takao, 4,999,313, Cl. 437-84.000.
Yoneyama, Sachiko: *See*—
Kabata, Toshiyuki; Ohsawa, Toshiyuki; Yoneyama, Sachiko; and Kimura, Okitoshi, 4,999,263, Cl. 429-131.000.
Yonezawa, Tomoyuki: *See*—
Koishi, Masaru; Yonezawa, Tomoyuki; Enomoto, Hiroshi; and Inoue, Kazushiro, 4,999,003, Cl. 280-103.000.
Yoon, Yong H., to Hyundai Electronics Industries Co., Ltd. Doping method using an oxide film and a nitride film on the trench wall to manufacture a semiconductor device and the manufactured device. 4,999,312, Cl. 437-52.000.
York, Norman N. Tree cutting apparatus. 4,998,573, Cl. 144-34.00R.
Yoshida Kogyo K.K.: *See*—
Kanzaka, Yoshiro, 4,998,660, Cl. 227-18.000.
Yoshida, Yukio; and Ohno, Kenzo, 4,999,551, Cl. 318-286.000.
Yoshida, Masahiko: *See*—
Nakase, Noriaki; Hokkedo, Mamoru; Yamamoto, Etsuji; Yoshida, Masahiko; and Kitayama, Yuyaka, 4,999,089, Cl. 196-110.000.
Yoshida, Satoshi: *See*—
Tanikawa, Hirohide; Nakahara, Toshiaki; Yoshida, Satoshi; Fujiwara, Masatsugu; and Sakashita, Kiichiro, 4,999,272, Cl. 430-106.600.
Yoshida, Teruo; and Ueno, Hiroshi, to Koyo Seiko Co., Ltd. Material for retainer of tapered roller bearings. 4,999,394, Cl. 524-514.000.
Yoshida, Yukio; and Ohno, Kenzo, to Yoshida Kogyo K.K. Method for controlling opening/closing of door in automatic door system. 4,999,551, Cl. 318-286.000.
Yoshikawa, Shigeo: *See*—
Nishida, Yasuaki; Fujisawa, Katsuya; Fujita, Yoshihiro; Fujiwara, Masao; Yoshikawa, Shigeo; and Uetsuki, Masao, 4,998,800, Cl. 350-162.200.
Yoshikawa, Shoko: *See*—
Newnham, Robert E.; Xu, Qichang C.; and Yoshikawa, Shoko, 4,999,819, Cl. 367-157.000.
Yoshimura, Ryoji: *See*—
Itoi, Hideyuki; Yoshimura, Ryoji; and Kaizuka, Tsuneo, 4,999,039, Cl. 65-54.000.
Yoshino, Junichi: *See*—
Terai, Akio; Yoshino, Junichi; Satsumi, Shinroku; and Taniguchi, Mitsuru, 4,998,401, Cl. 56-255.000.
Yoshiura, Tsukasa: *See*—
Onodera, Hiromi; Inaji, Toshio; Yoshiura, Tsukasa; Wakabayashi, Noriaki; Mitani, Hiroshi; and Tokura, Mitsuo, 4,999,558, Cl. 318-685.000.
Youden, David H., to Rank Taylor Hobson Inc. Device for minimizing the thermal sensitivity of a machining apparatus. 4,998,957, Cl. 82-117.000.
Young, Jeffrey H.: *See*—
Leo, Robert P.; McColgan, Mark W.; Stockman, James E., III; and Young, Jeffrey H., 4,999,834, Cl. 370-94.100.
Young, Ralph H.: *See*—
Schildkraut, Jay S.; Young, Ralph H.; Williams, David J.; and Scozzafava, Michael, 4,999,809, Cl. 365-106.000.
Yu, Tsunlock A.: *See*—
Vukovich, William J.; and Yu, Tsunlock A., 4,998,604, Cl. 192-3.300.

Yugenkaisha Shinjo Seisakusho: *See*—
Shinjo, Katsumi, 4,998,853, Cl. 411-29.000.
Yuzuriha, Naoki; and Yamamoto, Yoshimi, to Nissan Motor Company, Limited; and Fuji Kiko Company. Steering column assembly with energy absorption mechanism. 4,998,999, Cl. 280-777.000.
Zaenger, Ian C.: *See*—
Sikkenga, David L.; Zaenger, Ian C.; and Williams, Gregory S., 4,999,326, Cl. 502-30.000.
Zafiroglu, Dimitri P., to Du Pont de Nemours, E. I., and Company. Process for elastic stitchbonded fabric. 4,998,421, Cl. 66-192.000.
Zahnradfabrik Friedrichshafen AG: *See*—
Fuhrer, Gerd; and Heinzelmann, Karl-Fritz, 4,998,600, Cl. 184-6.100.
Zaidan Hohjin Doboku Kenkyu Center: *See*—
Chida, Shohei; Kozaki, Masami; Asahi, Toshinori; Ono, Chiyoaki; Iwasa, Seiji; Fukunaga, Taizou; and Takemura, Moriyuki, 4,998,776, Cl. 299-59.000.
Zanarella, Sergio: *See*—
Brufani, Mario; Ceccarelli, Stefano; Giannetti, Patrizia; Paesano, Agnese; Scuri, Romolo; and Zanarella, Sergio, 4,999,350, Cl. 514-210.000.
Zaunberger, Franz-Xaver, to Renk Aktiengesellschaft. Electromechanical drive system for a full-track vehicle. 4,998,591, Cl. 180-6.440.
Zavos, Panayiotis M.; and Dawson, Karl A., to University of Kentucky Research Foundation. Method for x and y spermatozoa separation. 4,999,283, Cl. 435-2.000.
Zehnder, William, Jr. Towel cabinet replenishment indication and identification system. 4,999,611, Cl. 340-568.000.
Zeltzer, Harry I. Contact lens for correction of color blindness. 4,998,817, Cl. 351-162.000.
Zenith Electronics Corporation: *See*—
Adler, Robert; Fendley, James R.; Lange, Howard G.; Prazak, Charles J., III; Steiner, Johann; and Strauss, Paul, 4,998,901, Cl. 445-3.000.
Zera, Nancy: *See*—
Vickroy, Harold C.; and Zera, Nancy, 4,998,921, Cl. 604-167.000.
Ziets, George A.: *See*—
Ahmad, Nawaz; Ziets, George A.; and Das, Sudeb, 4,999,342, Cl. 514-54.000.
Zimmer, David I.: *See*—
Porcellio, Rocco J.; and Zimmer, David I., 4,999,715, Cl. 358-433.000.
Zimmer, Johannes. Squeegee device. 4,998,500, Cl. 118-110.000.
Zimmer, Mark D., to Halliburton Logging Services, Inc. Programmable gain control for rotating transducer ultrasonic tools. 4,999,817, Cl. 367-65.000.
Zimmermann, Detlef: *See*—
Smith, Kevin; and Zimmermann, Detlef, 4,999,459, Cl. 174-35.0GC.
Zinnbauer, Gerald, to Kardon Industries, Inc. Tamper evidencing cap and container. 4,998,988, Cl. 215-230.000.
Zito, Richard R. Optical powder impurity detector. 4,999,512, Cl. 250-574.000.
Zoechbauer, Michael; and Fabinski, Walter, to Hartmann & Braun AG. Controllable interferometer. 4,999,013, Cl. 356-346.000.
Zumtobel Aktiengesellschaft: *See*—
Wiesner, Ernst, 4,998,339, Cl. 29-606.000.
Zyskind, John L.: *See*—
Austin, Richard F.; Feldman, Robert D.; Sulhoff, James W.; and Zyskind, John L., 4,999,694, Cl. 357-30.000.
3D Systems, Inc.: *See*—
Hull, Charles W.; and Lewis, Charles W., 4,999,143, Cl. 264-22.000.
501 United Distillers plc: *See*—
Bryan-Jones, David G., 4,999,301, Cl. 435-252.500.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 12TH DAY OF MARCH, 1991

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

AB Volvo: *See*—
Andersson, Lars; and Andersson, Sven, Re. 33,551, Cl. 74-331.000.
Andersson, Lars; and Andersson, Sven, to AB Volvo. Motor vehicle gearbox. Re. 33,551, Cl. 74-331.000.
Andersson, Sven: *See*—
Andersson, Lars; and Andersson, Sven, Re. 33,551, Cl. 74-331.000.
Behar, Alain: *See*—
Bougamont, Jean-Louis; and Behar, Alain, Re. 33,552, Cl. 222-402.160.
Bougamont, Jean-Louis; and Behar, Alain, to Societe Francaise d'Aerosol et de Bouchage. Dispensing valve. Re. 33,552, Cl. 222-402.160.
D'Agraives, Bertrand C.; Mathieu, Janny; and Jamar, Patrick, to Euratom, Communaute Europeenne de l'Energie Atomique; and Promotech, Association pour la Promotion de la Technologie. Surface texture reading access checking system. Re. 33,553, Cl. 340-825.310.
Euratom, Communaute Europeenne de l'Energie Atomique: *See*—
D'Agraives, Bertrand C.; Mathieu, Janny; and Jamar, Patrick, Re. 33,553, Cl. 340-825.310.
Jamar, Patrick: *See*—
D'Agraives, Bertrand C.; Mathieu, Janny; and Jamar, Patrick, Re. 33,553, Cl. 340-825.310.
Jones, Stephen. Restraint edge for paving members. Re. 33,550, Cl. 404-7.000.
Mathieu, Janny: *See*—
D'Agraives, Bertrand C.; Mathieu, Janny; and Jamar, Patrick, Re. 33,553, Cl. 340-825.310.
Promotech, Association pour la Promotion de la Technologie: *See*—
D'Agraives, Bertrand C.; Mathieu, Janny; and Jamar, Patrick, Re. 33,553, Cl. 340-825.310.
Societe Francaise d'Aerosol et de Bouchage: *See*—
Bougamont, Jean-Louis; and Behar, Alain, Re. 33,552, Cl. 222-402.160.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Bocci, Giorgio; Brizielli, Sando; Triuzzi, Agostino; and Deplano, Stefano, to Italimpianti Societe Italiana Impianti P.A. Method and walking beam furnace for the intermediate heating of pipes in hot rolling mills. B1 4,585,411, 3-12-91, Cl. 432-11.000.
Brizielli, Sando: *See*—
Bocci, Giorgio; Brizielli, Sando; Triuzzi, Agostino; and Deplano, Stefano, B1 4,585,411, Cl. 432-11.000.
Byrd, Carlisle O., Jr.: *See*—
Hounsel, Mack A.; and Byrd, Carlisle O., Jr., B1 4,449,345, Cl. 52-506.000.
Dentsply Research & Development Corp.: *See*—
Dougherty, Emery W.; and Welsh, Richard E., B1 4,330,280, Cl. 433-90.000.
Deplano, Stefano: *See*—
Bocci, Giorgio; Brizielli, Sando; Triuzzi, Agostino; and Deplano, Stefano, B1 4,585,411, Cl. 432-11.000.
Dougherty, Emery W.; and Welsh, Richard E., to Dentsply Research & Development Corp. Ejector holder for capsule-like cartridge. B1 4,330,280, 3-12-91, Cl. 433-90.000.
Gelston, Norbert E., II, to U.S. Tech Corporation. Microwave detection system. B1 4,613,812, 3-12-91, Cl. 324-635.000.
Hounsel, Mack A.; and Byrd, Carlisle O., Jr., to Manville Sales Corp. Insulation module hardware. B1 4,449,345, 3-12-91, Cl. 52-506.000.
Italimpianti Societe Italiana Impianti P.A.: *See*—
Bocci, Giorgio; Brizielli, Sando; Triuzzi, Agostino; and Deplano, Stefano, B1 4,585,411, Cl. 432-11.000.
Kohara, Hidekatsu: *See*—
Tanka, Hatsuyuki; Sato, Yoshiyuki; Kohara, Hidekatsu; and Nakayama, Toshimasa, B1 4,820,621, Cl. 430-331.000.
Loomans, Maurice E.; Matthews, Randall S.; and Miller, Joseph A., to Procter & Gamble Company, The. Novel anti-inflammatory agents, pharmaceutical compositions and methods for reducing inflammation. B1 4,708,966, 3-12-91, Cl. 514-689.000.
Loomans, Maurice E.; Matthews, Randall S.; and Miller, Joseph A., to Procter & Gamble Company, The. Tert-butylphenyl compounds useful as anti-inflammatory agents. B1 4,847,303, 3-12-91, Cl. 514-689.000.
Manville Sales Corp.: *See*—
Hounsel, Mack A.; and Byrd, Carlisle O., Jr., B1 4,449,345, Cl. 52-506.000.
Matthews, Randall S.: *See*—
Loomans, Maurice E.; Matthews, Randall S.; and Miller, Joseph A., B1 4,708,966, Cl. 514-689.000.
Loomans, Maurice E.; Matthews, Randall S.; and Miller, Joseph A., B1 4,847,303, Cl. 514-689.000.
Miller, Joseph A.: *See*—
Loomans, Maurice E.; Matthews, Randall S.; and Miller, Joseph A., B1 4,708,966, Cl. 514-689.000.
Loomans, Maurice E.; Matthews, Randall S.; and Miller, Joseph A., B1 4,847,303, Cl. 514-689.000.
Miyamoto, Michikazu, to Shoketsu Kinzoku Kogyo Kabushiki Kaisha. Rodless cylinder. B1 4,488,477, 3-12-91, Cl. 92-85.00R.
Nakayama, Toshimasa: *See*—
Tanka, Hatsuyuki; Sato, Yoshiyuki; Kohara, Hidekatsu; and Nakayama, Toshimasa, B1 4,820,621, Cl. 430-331.000.
Procter & Gamble Company, The: *See*—
Loomans, Maurice E.; Matthews, Randall S.; and Miller, Joseph A., B1 4,708,966, Cl. 514-689.000.
Loomans, Maurice E.; Matthews, Randall S.; and Miller, Joseph A., B1 4,847,303, Cl. 514-689.000.
Sato, Yoshiyuki: *See*—
Tanka, Hatsuyuki; Sato, Yoshiyuki; Kohara, Hidekatsu; and Nakayama, Toshimasa, B1 4,820,621, Cl. 430-331.000.
Shoketsu Kinzoku Kogyo Kabushiki Kaisha: *See*—
Miyamoto, Michikazu, B1 4,488,477, Cl. 92-85.00R.
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Bak, Gerardus J.; Steur, Nicolaas D.; and Bak, Elly, to Corn. Bak B.V. Guzmania plant named Rana. 7,471, 3-12-91, Cl. 89.000.
Corn. Bak B.V.: *See*—
Bak, Gerardus J.; Steur, Nicolaas D.; and Bak, Elly, 7,471, Cl. 89.000.
Craig, Richard; and Hanniford, Glenn G., to Research Corporation Technologies. Regal Pelargonium 'Allure'. 7,467, 3-12-91, Cl. 68.000.
Hanniford, Glenn G.: *See*—
Craig, Richard; and Hanniford, Glenn G., 7,467, Cl. 68.000.
Research Corporation Technologies: *See*—
Craig, Richard; and Hanniford, Glenn G., 7,467, Cl. 68.000.
Segers, Th. A., to Twyford Plant Laboratories, Inc. Gerbera plant 'Matador' . 7,466, 3-12-91, Cl. 68.000.
Steur, Nicolaas D.: *See*—
Bak, Gerardus J.; Steur, Nicolaas D.; and Bak, Elly, 7,471, Cl. 89.000.
Twyford Plant Laboratories, Inc.: *See*—
Segers, Th. A., 7,466, Cl. 68.000.
VandenBerg, Cornelis P., to Yoder Brothers, Inc. Chrysanthemum plant named 'Alouette'. 7,468, 3-12-91, Cl. 74.000.
VandenBerg, Cornelis P., to Yoder Brothers, Inc. Chrysanthemum plant named Miramar. 7,469, 3-12-91, Cl. 74.000.
VandenBerg, Cornelis P., to Yoder Brothers, Inc. Chrysanthemum plant named Forge. 7,470, 3-12-91, Cl. 74.000.
Yoder Brothers, Inc.: *See*—
VandenBerg, Cornelis P., 7,468, Cl. 74.000.
VandenBerg, Cornelis P., 7,469, Cl. 74.000.
VandenBerg, Cornelis P., 7,470, Cl. 74.000.

CLASSIFICATION OF PATENTS

ISSUED MARCH 12, 1991

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

69.5 4,998,296

CLASS 4

242 4,998,297
254 4,998,298
349 4,998,299
420.4 4,998,300
457 4,998,301
516 4,998,302
523 4,998,303
559 4,998,304
604 4,998,305
619 4,998,306

CLASS 5

94 4,998,307
424 4,998,308
4,998,939
434 4,998,309
449 4,998,310
455 4,998,311

CLASS 7

166 4,998,312

CLASS 8

94.26 4,999,024
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471 4,999,026
543 4,999,027

CLASS 14

71.1 4,998,313

CLASS 15

4 4,998,314
160 4,998,315
181 4,998,316
321 4,998,317

CLASS 16

8 4,998,319
34 4,998,940
35 R 4,998,320
110 R 4,998,321
121 4,998,318
375 4,998,941

CLASS 19

106 R 4,998,325

CLASS 24

20 R 4,998,326
134 R 4,998,327
639 4,998,328
662 4,998,329
700 4,998,330

CLASS 28

245 4,998,942
295 4,998,331

CLASS 29

90.01 4,998,332
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239 4,998,334
402.06 4,998,335
432 4,998,336
432.2 4,998,943
527.4 4,998,337
527.6 4,998,338
606 4,998,339
623.1 4,998,340
828 4,998,341
840 4,998,342
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894.362 4,998,344
897.2 4,998,345
898.61 4,998,346

CLASS 30

34.2 4,998,347
114 4,998,348
131 4,998,349
151 4,998,350
228 4,998,351
346.51 4,998,352
392 4,998,353

CLASS 33

514.2 4,998,354
667 4,998,355
767 4,998,356

CLASS 36

117 4,998,358

CLASS 38

14 4,998,359
36 4,998,360

CLASS 40

152 4,998,361
152.1 4,998,362
156 4,998,363
411 4,998,364
545 4,998,365
547 4,998,366

CLASS 42

71.02 4,998,367
94 4,998,944
95 4,998,368

CLASS 43

6.5 4,998,369
42.06 4,998,370
42.16 4,998,371
42.24 4,998,372
42.37 4,998,373
42.74 4,998,374
43.16 4,998,375
61 4,998,376
125 4,998,377

CLASS 47

1.01 4,998,945
77 4,998,378

CLASS 48

197 R 4,999,029
4,999,030

CLASS 49

138 4,998,379
462 4,998,380
463 4,998,381
497 4,998,946
501 4,998,382

CLASS 51

165.71 4,998,383
168 4,998,384
287 4,998,385

CLASS 52

16 4,998,386
20 4,998,387
36 4,998,388
90 4,998,389
95 4,998,390
179 4,998,391
208 4,998,392
236.9 4,998,393
300 4,998,947
426 4,998,394
506 B1 4,449,345
563 4,998,395
595 4,998,396
715 4,998,397
745 4,998,398

CLASS 53

398 4,998,399
425 4,998,400

CLASS 55

43 4,999,031
97 4,999,032
181 4,999,033
275 4,999,034
4,999,035
317 4,999,036
385.1 4,999,037
491 4,999,038

CLASS 56

12.6 4,998,948
255 4,998,401
340.1 4,993,402

CLASS 57

18 4,998,403
263 4,998,404
279 4,998,405
281 4,998,406
328 4,998,407

CLASS 60

39.161 4,998,949
39.182 4,998,408
226.2 4,998,409
259 4,998,410
517 4,998,411
562 4,998,950
608 4,998,951

CLASS 62

126 4,998,412
149 4,998,413
231 4,998,415
259.3 4,998,414
292 4,998,416
532 4,998,417

CLASS 65

54 4,999,039
325 4,999,040

CLASS 66

14 4,998,418
25 4,998,419
138 4,998,420
192 4,998,421

CLASS 70

38 A 4,998,422
40 4,998,423
63 4,998,424
159 4,998,425
395 4,998,952
452 4,998,953
494 4,998,426

CLASS 71

70 4,999,041
88 4,999,042
92 4,999,043
4,999,044
4,999,045
4,999,046
94 4,999,047
118 4,999,048

CLASS 72

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283 4,998,429
335 4,998,430

CLASS 73

1 G 4,998,431
19.07 4,998,432
25.01 4,998,433
40.50 R 4,998,434
40.7 4,998,435
117 4,998,436
118.1 4,998,437
146.8 4,998,438
592 4,998,439
810 4,998,440
862.04 4,998,441
863.58 4,998,954

CLASS 74

89.17 4,998,442
331 Re.33,551
335 4,998,443
4,998,444
4,998,445
473 R 4,998,446
502.6 4,998,447
567 4,998,955
573 R 4,998,448
844 4,998,449
850 4,998,450
867 4,998,451

CLASS 75

234 4,999,049
244 4,999,050
338 4,999,051
4,999,052
564 4,999,053

CLASS 76

83 4,998,956

CLASS 81

57.37 4,998,452
57.38 4,998,453
460 4,998,454

CLASS 82

117 4,998,957
127 4,998,455

CLASS 83

133 4,998,958

CLASS 84

384 4,998,456
400 4,998,959
600 4,998,457
622 4,998,960

CLASS 89

46 4,998,458

CLASS 92

85 R B1 4,488,477
88 4,998,459
162 R 4,998,460
248 4,998,461

CLASS 99

289 T 4,998,462
300 4,998,463
455 4,998,464
584 4,998,465
591 4,998,466
632 4,998,467
636 4,998,468

CLASS 050

385.1 4,999,501

CLASS 100

2 4,998,469
4 4,998,961

CLASS 101

115 4,998,470
126 4,998,471
211 4,998,962
216 4,998,472
333 4,998,473
366 4,998,474
4,998,475

CLASS 102

226 4,998,476
275.6 4,998,477
275.7 4,998,478
275.9 4,998,963
334 4,998,479
393 4,998,480

CLASS 104

166 4,998,481
178 4,998,482

CLASS 105

3 4,998,483

CLASS 106

1.23 4,999,054
436 4,999,055
737 4,999,056

CLASS 108

42 4,998,484

CLASS 110

234 4,998,485
346 4,998,486
347 4,998,487

CLASS 111

7.1 4,999,057
187 4,998,488

CLASS 112

103 4,998,489
121.12 4,998,964
231 4,998,490
262.1 4,998,491
303 4,998,492
305 4,998,965
453 4,998,493

CLASS 114

39.2 4,998,494
218 4,998,495
222 4,998,496
230 4,998,497
270 4,998,966
345 4,998,498

CLASS 116

142 FP 4,998,499

CLASS 118

110 4,998,500
312 4,998,501
667 4,998,502
723 4,998,503
4,998,968

CLASS 119

3 4,998,505
18 4,998,506
22 4,998,967
109 4,998,507
168 4,998,504

CLASS 122

4 D 4,998,508
504 4,998,509

CLASS 123

41.7 4,998,510
48 B 4,998,511
65 PE 4,998,512
76 4,998,513
90.53 4,998,514
187.5 R 4,998,969
195 C 4,998,515
198 E 4,998,516
270 4,998,517
306 4,998,518
333 4,998,519
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502 4,998,523
559.1 4,998,524
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598 4,998,526

CLASS 126

376 4,998,970

CLASS 127

29 4,999,058

CLASS 128

6 4,998,527
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4,998,972
4,998,973
24 A 4,998,528
80 H 4,998,537
201.13 4,998,529
203.11 4,998,530
419 D 4,998,531
4,998,975
419 F 4,998,532
419 PG 4,998,974
637 4,998,533
653 OSC 4,998,976
670 4,998,534
673 4,998,977
696 4,998,535
800 4,998,536
856 4,998,538
898 4,998,539

CLASS 131

110 4,998,540
336 4,998,541
365 4,998,542
4,998,543

CLASS 132

212 4,998,544
290 4,998,545
321 4,998,978

CLASS 134

1 4,998,979
40 4,998,546
57 R 4,998,547
111 4,998,548
184 4,998,549
200 4,998,550

CLASS 135

20 R 4,998,551
102 4,998,552

CLASS 136

248 4,999,059
251 4,999,060

CLASS 137

13 4,998,553
217 4,998,554
359 4,998,555
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505.42 4,998,557
510 4,998,558
596.17 4,998,559
616 4,998,560
630.14 4,998,561
877 4,998,562

CLASS 138

122 4,998,563
126 4,998,564
4,998,565

CLASS 139

35 4,998,566
116.2 4,998,567
383 A 4,998,568
4,998,569

CLASS 141

27 4,998,570
198 4,998,571

CLASS 142

55 4,998,572

CLASS 144

34 R 4,998,573
241 4,998,574

CLASS 148

12.7 A 4,999,061

CLASS 149

2 4,999,062
109.6 4,999,063

CLASS 152

324 4,998,980
540 4,998,575

CLASS 156

62.2 4,999,064
64 4,999,065
71 4,999,066
73.1 4,999,067
78 4,999,068
84 4,999,069
85 4,999,070
99 4,999,071
145 4,999,072
197 4,999,073
204 4,999,074
209 4,999,075
241 4,999,076
299 4,999,077
327 4,999,078
345 4,999,079
441 4,999,080
515 4,999,081
605 4,999,082
628 4,999,083

CLASS 160

90 4,998,576
202 4,998,577

CLASS 162

4 4,999,084
40 4,999,085
209 4,999,086
301 4,999,087
317 4,999,088

CLASS 164

6 4,998,578
130 4,998,579
517 4,998,581

CLASS 165

11.1 4,998,582
133 4,998,580
163 4,998,583
171 4,998,584

CLASS 166

105 4,998,585

CLASS 168

12 4,998,586

CLASS 169

51 4,998,587

CLASS 173

47 4,998,588
170 4,998,589

CLASS 174

9 R 4,999,458
35 GC 4,999,459
94 R 4,999,460

CLASS 175

162 4,998,590
286 4,998,981

CLASS 178

19 4,999,461
4,999,462

CLASS 180

6.44 4,998,591
89.12 4,998,592
140 4,998,593
198 4,998,594
202 4,998,595
213 4,998,596

CLASS 181

243 4,998,597
284 4,998,598

CLASS 182

159 4,998,982
160 4,998,599

CLASS 184

6.1 4,998,600

CLASS 187

107 4,998,601

CLASS 188

328 4,998,602

CLASS 190

18 A 4,998,603

CLASS 192

1.52 4,998,983
3.3 4,998,604
41 A 4,998,605
56 F 4,998,606
58 B 4,998,607
106.2 4,998,608
109 F 4,998,609

CLASS 194

318 4,998,610
337 4,998,611
350 4,998,612

CLASS 196

110 4,999,089

CLASS 198

335 4,998,613
463.4 4,998,614

CLASS 200

144 B 4,999,463
267 4,999,464
308 4,999,465

CLASS 203

36 4,999,090

CLASS 204

14.1 4,999,091
68 4,999,092
129.1 4,999,093
180.2 4,999,094
182.4 4,999,095
192.3 4,999,096
243 R 4,999,097
301 4,999,098

CLASS 206

44.12 4,998,615
45.11 4,998,616
205 4,998,984
219 4,998,617
307 4,998,618
387 4,998,985
392 4,998,619
440 4,998,620
466 4,998,621
519 4,998,622
531 4,998,623

CLASS 208

39 4,999,099
155 4,999,100

CLASS 209

5 4,998,624
44 4,998,986
234 4,998,625
552 4,998,987
584 4,998,626

CLASS 210

85 4,999,101
137 4,999,102
151 4,999,103
196 4,999,104
198.2 4,999,105
222 4,999,106
224 4,999,107
243 4,999,108
244 4,999,109
490 4,999,110
605 4,999,111
656 4,999,112
664 4,999,113
709 4,999,114
4,999,116
728 4,999,115
744 4,999,117
771 4,999,118

CLASS 211

13 4,998,627
59.2 4,998,628
71 4,998,629
4,998,630
74 4,998,631

CLASS 215

201 4,998,632
230 4,998,988
250 4,998,989
311 4,998,633

CLASS 219

10.493 4,999,467
10.55 A 4,999,468
4,999,469
10.55 E 4,999,466
4,999,470
10.55 M 4,999,471
56.22 4,999,472
69.12 4,999,473
74 4,999,474
86.41 4,999,475
97 4,999,476
110 4,999,477
137 WM 4,999,478
145.22 4,999,479
242 4,999,480

CLASS 220

1.5 4,998,634
3.4 4,998,635
4.34 4,998,636
6 4,998,637
85 F 4,998,639
262 4,998,640
268 4,998,641
307 4,998,642
600 4,998,643
626 4,998,638

CLASS 221

24 4,998,644

CLASS 222

92 4,998,990
98 4,998,645
107 4,998,646
143 4,998,647
181 4,998,991
370 4,998,648
402.16 Re.33,552
507 4,998,649
599 4,998,650

CLASS 223

66 4,998,992
101 4,998,651

CLASS 224

39 4,998,652
151 4,998,653
204 4,998,654

CLASS 225

26 4,998,655
47 4,998,656

CLASS 226

52 4,998,657
95 4,998,658

CLASS 227

7 4,998,659
18 4,998,660
67 4,998,661
111 4,998,662

CLASS 228

2 4,998,663
102 4,998,664
180.1 4,998,665

CLASS 229

102 4,998,666
120.37 4,998,667
123.1 4,998,668
170 4,998,669

CLASS 235

375 4,999,481
457 4,999,482
492 4,999,601

CLASS 238

14 4,998,670

CLASS 239

44 4,998,671
67 4,998,673
295 4,998,993
585 4,998,672
652 4,998,674

CLASS 241

36 4,998,675
55 4,998,676
95 4,998,677
171 4,998,678
243 4,998,679

CLASS 242

54 R 4,998,680
55.53 4,998,681
67.10 R 4,998,682
99 4,998,683
107.40 A 4,998,684
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186 4,998,686

CLASS 244

3.1 4,998,994
3.16 4,998,688
46 4,998,689
55 4,998,995
100 R 4,998,687
158 R 4,998,690

CLASS 248

56 4,998,692
74.1 4,998,691
75 4,998,693
100 4,998,694
101 4,998,695
146 4,998,696
165 4,998,697
176 4,998,698
188.7 4,998,699
214 4,998,700
224.3 4,998,701
278 4,998,702
326 4,999,435
447 4,998,703
447.1 4,998,704

CLASS 249

177 4,998,705
184 4,998,706

CLASS 250

203.1 4,999,483
208.1 4,999,484
213 A 4,999,485
4,999,486
216 4,999,487
222.2 4,999,488
226 4,999,489
236 4,999,491
281 4,999,492
288 4,999,493
306 4,999,494
4,999,495
310 4,999,496
327.2 4,999,497
338.5 4,999,498
342 4,999,499
385.1 4,999,500
472.1 4,999,503
484.1 4,999,504
4,999,505
4,999,515
491.1 4,999,506
492.2 4,999,507
495.1 4,999,502
560 4,999,508
4,999,509
571 4,999,510
572 4,999,511
574 4,999,512
575 4,999,513
4,999,514

CLASS 251

129.15 4,998,707
306 4,998,708

CLASS 252

3 4,999,119
8.6 4,999,120
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51.5 R 4,999,123
90 4,999,124
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162 4,999,126
171 4,999,127
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174.17 4,999,129
299.01 4,999,130
314 4,999,131
356 4,999,132
373 4,999,133
389.51 4,999,134
511 4,999,135
512 4,999,136
516 4,999,137
543 4,999,138
587 4,999,139

CLASS 254

26 E 4,998,996

CLASS 261

59 4,999,140

CLASS 264

1.4 4,999,141
1.7 4,999,142
22 4,999,143
29.5 4,998,709
40.4 4,999,151
56 4,999,144
60 4,999,145
127 4,999,146
139 4,999,147
174 4,999,148
187 4,999,149
257 4,999,150
555 4,999,152

CLASS 266

286 4,998,710

CLASS 267

003 4,998,997

CLASS 269

21 4,998,711
25 4,998,712

CLASS 271

117 4,998,714
197 4,998,715
263 4,998,998
297 4,998,716

CLASS 272

3 4,998,717
66 4,998,718
76 4,998,719
96 4,998,720
4,998,722
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118 4,998,721
129 4,998,725

CLASS 273

1 GI 4,998,724
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55 R 4,998,727
65 EB 4,998,728
119 R 4,998,729
148 A 4,998,730
167 R 4,999,000
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212 4,998,732
232 4,998,733
235 R 4,998,734
249 4,998,735
4,998,736
269 4,999,001
296 4,998,737
421 4,998,738

CLASS 277

53 4,998,739
205 4,998,740
235 B 4,998,741

CLASS 279

2 A 4,999,002

CLASS 280

35 4,998,742
47.26 4,998,743
103 4,999,003
202 4,998,744
508 4,998,745
615 4,998,746
631 4,998,747
690 4,998,748
712 4,998,749
740 4,998,750
741 4,998,751
777 4,998,999

CLASS 283

34 4,998,752
82 4,998,753

CLASS 285

150 4,998,754
181 4,998,755
298 4,998,756
322 4,998,831

CLASS 292

39 4,998,757
201 4,998,758
340 4,998,759
347 4,998,760

CLASS 293

121 4,998,761

CLASS 294

68.23 4,998,762
82.33 4,998,763
146 4,998,764

CLASS 296

37.8 4,998,770
97.1 4,998,767
97.11 4,998,765
136 4,998,766
4,998,768
183 4,998,769
217 4,998,771

CLASS 297

355 4,998,772
446 4,998,773
461 4,998,774
480 4,999,004

CLASS 299

39 4,998,775
59 4,998,776
67 4,998,777
91 4,998,778

CLASS 300

10 4,998,779

CLASS 301

37 S 4,998,780

CLASS 303

10 4,998,781
110 4,998,782

CLASS 305

56 4,998,783

CLASS 307

54 4,999,524
201 4,999,525
269 4,999,526
273 4,999,527
279 4,999,528
296.3 4,999,516
446 4,999,517
4,999,518
4,999,519
456 4,999,520
475 4,999,529
498 4,999,521
520 4,999,522
570 4,999,523

CLASS 310

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23 4,999,531
71 4,999,532
90 4,999,533
90.5 4,999,534
313 B 4,999,535
323 4,999,536

CLASS 313

311 4,999,537
318 4,999,538
505 4,999,539
533 4,999,540
584 4,999,541

CLASS 315

85 4,999,542
169.3 4,999,543
185 S 4,999,544
219 4,999,545
225 4,999,546
307 4,999,547
370 4,999,548
387 4,999,549

CLASS 318

50 4,999,550
286 4,999,551
434 4,999,552
561 4,999,553
569 4,999,554
578 4,999,555
599 4,999,556
609 4,999,557
685 4,999,558
696 4,999,559
779 4,999,560
812 4,999,561

CLASS 320

7 4,999,562

CLASS 322

90 4,999,563
99 4,999,564

CLASS 323

210 4,999,565
222 4,999,566
315 4,999,567
351 4,999,568

CLASS 324

74 4,999,569
96 4,999,570
4,999,571
121 R 4,999,573
133 4,999,574
142 4,999,575
4,999,576
158 F 4,999,578
158 R 4,999,577
166 4,999,579
309 4,999,580
4,999,581
438 4,999,582
635 B1 4,613,812

CLASS 330

86 4,999,583
107 4,999,584
288 4,999,586

CLASS 331

107 DP 4,999,587
109 4,999,588
117 R 4,999,589

CLASS 332

104 4,999,590
149 4,999,585

CLASS 333

21 R 4,999,591
26 4,999,592
112 4,999,593
181 4,999,594
184 4,999,595
204 4,999,596
246 4,999,597

CLASS 335

122 4,999,598
207 4,999,599
306 4,999,600

CLASS 338

308 4,999,602

CLASS 340

323 R 4,999,603
4,999,604
456 4,999,605
525 4,999,606
533 4,999,607
550 4,999,608
551 4,999,609
567 4,999,610
568 4,999,611
569 4,999,612
573 4,999,613
588 4,999,614
590 4,999,615
674 4,999,616
706 4,999,617
781 4,999,618
784 4,999,619
799 4,999,620
825.31 Re.33,553
825.34 4,999,621
825.720 4,999,622

CLASS 341

13 4,999,623
118 4,999,624
4,999,625
120 4,999,630
4,999,633
126 4,999,626
131 4,999,627
139 4,999,628
155 4,999,629
156 4,999,631
167 4,999,632
172 4,999,634

CLASS 342

25 4,999,635
90 4,999,636

103 R 4,999,572
367 4,999,637
389 4,999,638

CLASS 343

704 4,999,639
706 4,999,640
742 4,999,641
822 4,999,642

CLASS 346

1.1 4,999,643
4,999,644
4,999,645
11 4,999,646
75 4,999,647
107 R 4,999,648
134 4,999,649
140 R 4,999,650
4,999,651
4,999,652
159 4,999,653
160 4,999,654

CLASS 350

1.4 4,999,005
3.7 4,998,784
4,998,785
4,998,786
3.73 4,998,787
3.8 4,998,788
4.1 4,998,789
6.1 4,998,790
96.14 4,998,791
96.15 4,998,792
4,998,793
96.18 4,998,794
96.20 4,998,795
96.21 4,998,796
4,998,797
115 4,998,798
133 4,998,799
162.12 4,999,006
162.2 4,998,800
4,998,801
247 4,998,802
321 4,998,803
334 4,998,804
355 4,998,805
413 4,998,806
423 4,998,807
426 4,999,007
427 4,998,808
500 4,998,809
528 4,998,810
556 4,998,357
560 4,998,811
604 4,998,812
624 4,998,813
632 4,998,814

CLASS 351

106 4,998,815
113 4,999,008
156 4,998,816
162 4,998,817
205 4,998,818
212 4,998,819
4,999,009
243 4,998,820

CLASS 353

14 4,999,011
4,999,012
122 4,998,821

CLASS 354

173.1 4,999,655
195.12 4,999,656
220 4,999,657
225 4,999,658
286 4,999,659
324 4,999,660
402 4,999,661
412 4,999,662
415 4,999,663
446 4,999,664
468 4,999,665

CLASS 355

27 4,999,666
28 4,999,667
38 4,999,668
53 4,999,669
91 4,999,670
97 4,999,671
202 4,999,672
208 4,999,673
218 4,999,674
245 4,999,675
246 4,999,676
273 4,999,677
297 4,999,678
303 4,999,679
326 4,999,680

CLASS 356

346 4,999,010
4,999,013
347 4,999,681
350 4,998,822
356 4,998,823
382 4,999,014
407 4,998,824

CLASS 357

4 4,999,682
13 4,999,683
4,999,684
15 4,999,685
16 4,999,686
4,999,687
19 4,999,688
23.6 4,999,689
23.7 4,999,690
4,999,691
27 4,999,692
30 4,999,693
4,997,694
4,999,695
4,999,696
34 4,999,697
45 4,999,698
65 4,999,699
70 4,999,700

CLASS 358

12 4,999,701
32 4,999,702
60 4,999,703
133 4,999,704
136 4,999,705
147 4,999,706
153 4,999,707
4,999,708
160 4,999,709
4,999,710
169 4,999,711
213.11 4,999,712
225 4,999,713
337 4,999,714
433 4,999,715
434 4,999,716
448 4,999,717
455 4,999,718

CLASS 360

35.1 4,999,719
48 4,999,720
74.1 4,999,721
77.150 4,999,722
96.5 4,999,723
98.08 4,999,724
105 4,999,725
120 4,999,726
133 4,999,727

CLASS 361

33 4,999,728
56 4,999,729
59 4,999,730
119 4,999,731
150 4,999,732
213 4,999,733
278 4,999,734
283 4,999,735
321 4,999,736
4,999,737
4,999,738
4,999,739
386 4,999,740
387 4,999,741
400 4,999,742
4,999,743
415 4,999,744
429 4,999,745

CLASS 362

74 4,999,746
103 4,999,747
147 4,999,748
153.1 4,999,749
203 4,999,750
226 4,999,751
228 4,999,752
234 4,999,753
237 4,999,754
250 4,999,755
4,999,756
287 4,999,757
373 4,999,758

CLASS 363

21 4,999,759
53 4,999,760
60 4,999,761
144 4,999,762

CLASS 364

140 4,999,763
167.01 4,999,764
191 4,999,765
200 4,999,766
4,999,767
4,999,768
4,999,769
4,999,770
4,999,771
413.05 4,999,772
419 4,999,773
424.03 4,999,775
424.05 4,999,776
424.050 4,999,777
424.1 4,999,774
426.02 4,999,778
426.03 4,999,779
428 4,999,780
431.05 4,999,781
448 4,999,782
450 4,999,783
474.01 4,999,784
507 4,999,785
513 4,999,786
514 4,999,787
518 4,999,788
4,999,789
521 4,999,790
525 4,999,791
550 4,999,792
569 4,999,793
707 4,999,794
709.16 4,999,795
715.08 4,999,796
720 4,999,797
724.1 4,999,798
726 4,999,799
748 4,999,800
4,999,801
4,999,802
4,999,803
784 4,999,804
900 4,999,805
4,999,806
4,999,807
4,999,808

CLASS 365

106 4,999,809
124 4,999,810
149 4,999,811
185 4,999,812
201 4,999,813
222 4,999,814
230.06 4,999,815

CLASS 366

176 4,999,015

CLASS 367

4 4,999,816
65 4,999,817
139 4,999,818
157 4,999,819

CLASS 368

9 4,999,820
12 4,999,821
228 4,999,822
295 4,999,823

CLASS 369

13 4,999,824
44.18 4,999,827
44.26 4,999,825
44.41 4,999,826
59 4,999,828

CLASS 370

16 4,999,829
32.1 4,999,830
50 4,999,831
85.14 4,999,832
94.1 4,999,833
4,999,834
4,999,835
110.1 4,999,836

CLASS 371

3 4,999,837
16.1 4,999,838

CLASS 372

2 4,999,839
18 4,999,840
45 4,999,841
4,999,842
4,999,843
4,999,844

CLASS 374

50 4,998,825
129 4,998,826
160 4,998,827

CLASS 376

443 4,999,153
446 4,999,154

CLASS 384

18 4,998,828
255 4,998,829
563 4,998,830

CLASS 400

76 4,998,832
88 4,999,016
208 4,998,833
247 4,998,834
611 4,998,835

CLASS 401

32 4,999,017
42 4,998,836
85 4,998,837
202 4,998,838
208 4,998,839

CLASS 402

3 4,998,840

CLASS 403

104 4,998,841
252 4,998,842

CLASS 404

6 4,998,843
7 Re.33,550

CLASS 405

21 4,998,844
66 4,998,845
78 4,998,846
127 4,998,847
128 4,998,848
303 4,998,849

CLASS 406

48 4,998,850

CLASS 408

143 4,998,851
241 R 4,999,018

CLASS 409

144 4,998,852

CLASS 411

29 4,998,853
512 4,999,019

CLASS 414

133 4,998,855
240 4,998,856
331 4,998,857
495 4,998,858
680 4,998,859
718 4,999,022
750 4,998,860

CLASS 415

206 4,998,861

CLASS 417

28 4,998,862
63 4,998,863
222 4,999,020
410 4,998,864
423.7 4,998,865
460 4,998,866

CLASS 418

256 4,998,867
257 4,998,868

CLASS 419

2 4,999,155
5 4,999,156
68 4,999,157

CLASS 420

8 4,999,158
53 4,999,159
529 4,999,160

CLASS 422

12 4,999,161
54 4,999,162
58 4,999,163
100 4,999,164
113 4,999,165
131 4,999,166
175 4,999,167
179 4,999,168

CLASS 423

54 4,999,169
112 4,999,170
4,999,171
226 4,999,172
239 4,999,173
241 4,999,174
244 4,999,175
289 4,999,176
415 A 4,999,177
571 4,999,178
584 4,999,179
592 4,999,180
608 4,999,181
4,999,182

CLASS 424

47 4,999,183
52 4,999,184
58 4,999,185
60 4,999,186
70 4,999,187
78 4,999,188
79 4,999,189
4,999,190
92 4,999,191
93 4,999,192
4,999,193
94.63 4,999,194
114 4,999,195
116 4,999,196
195.1 4,999,197
449 4,999,198
450 4,999,199
472 4,999,226
480 4,999,200
613 4,999,201
683 4,999,202

CLASS 425

81.1 4,998,869
113 4,998,870
140 4,998,871
143 4,998,872
541 4,998,873
556 4,998,874
577 4,998,875

CLASS 426

46 4,999,203
104 4,999,204
250 4,999,205
512 4,999,206
536 4,999,207
549 4,999,208
592 4,999,209

CLASS 427

2 4,999,210
8 4,999,211
4,999,212
27 4,999,213
39 4,999,214
41 4,999,215
44 4,999,216
48 4,999,217
54.1 4,999,218
69 4,999,219
132 4,999,220
195 4,999,221
250 4,999,222
252 4,999,223
356 4,999,224
423 4,999,225

CLASS 428

31 4,999,227
34.4 4,999,228
36.6 4,999,229
43 4,999,230
95 4,999,231
113 4,999,232
122 4,999,233
156 4,999,234
4,999,235
192 4,999,246
233 4,999,236
280 4,999,237
283 4,999,238
288 4,999,239
4,999,240
340 4,999,241
345 4,999,242
372 4,999,243
4,999,244
374 4,999,245
383 4,999,247
422 4,999,248
447 4,999,249
457 4,999,250
458 4,999,251
515 4,999,252
4,999,253
518 4,999,254
552 4,999,255
4,999,256
555 4,999,257
632 4,999,258
685 4,999,259
694 4,999,260
697 4,999,261

CLASS 429

104 4,999,262
131 4,999,263
171 4,999,264
198 4,999,265

CLASS 430

14 4,999,266
58 4,999,267
4,999,269
59 4,999,268
67 4,999,270
106.6 4,999,272
138 4,999,273
190 4,999,274
264 4,999,275
4,999,276
269 4,999,277
270 4,999,278
284 4,999,271
330 4,999,280
331 B1 4,820,621
495 4,999,281
569 4,999,282
781 4,999,279

CLASS 431

3 4,998,876
19 4,998,877
90 4,998,878

CLASS 432

11 B1 4,585,411
253 4,998,879

CLASS 433

80 4,998,880
90 B1 4,330,280
173 4,998,881

CLASS 434

98 4,998,882
159 4,998,883

CLASS 435

2 4,999,283
4 4,999,284
6 4,999,290
7.32 4,999,286
7.9 4,999,285
11 4,999,287
18 4,999,288
19 4,999,289
69.1 4,999,291
172.1 4,999,292
172.3 4,999,293
4,999,294
177 4,999,295
235.1 4,999,296
240.23 4,999,297
240.242 4,999,298
240.47 4,999,299
252.34 4,999,300
252.5 4,999,301
266 4,999,302
300 4,999,303

CLASS 436

45 4,999,304
52 4,999,305
68 4,999,306
180 4,999,307

CLASS 437

4 4,999,308
15 4,999,309
51 4,999,310
4,999,311
52 4,999,312
84 4,999,313
89 4,999,314
129 4,999,316
189 4,999,317
194 4,999,318
209 4,999,319
225 4,999,320

CLASS 439

49 4,998,884
66 4,998,885
4,998,886
68 4,999,023
73 4,998,888
78 4,998,887
94 4,999,315
247 4,998,889
326 4,998,890
369 4,998,891
381 4,998,892
488 4,998,893
521 4,998,894
585 4,998,895
595 4,998,896
629 4,998,897

CLASS 440

37 4,998,898

CLASS 441

3 4,998,899
38 4,998,900

CLASS 445

3 4,998,901

CLASS 446

2 4,998,902
102 4,998,903

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CLASS 452

71 4,998,322
125 4,998,323
149 4,998,324

CLASS 460

70 4,998,904

CLASS 474

42 4,998,905
153 4,998,906
206 4,998,907
245 4,998,908
415 4,999,021

CLASS 475

331 4,998,909

CLASS 493

12 4,998,910
108 4,998,911

CLASS 501

42 4,999,321
83 4,999,322
103 4,999,323
107 4,999,324
115 4,999,325

CLASS 502

30 4,999,326
119 4,999,327
151 4,999,328
202 4,999,329
402 4,999,330

CLASS 503

200 4,999,331
209 4,999,332
4,999,333
226 4,999,334
227 4,999,335

CLASS 505

1 4,999,336
4,999,337
4,999,338

CLASS 514

2 4,999,339
23 4,999,340
33 4,999,341
54 4,999,342
4,999,343
77 4,999,344
117 4,999,345
120 4,999,346
159 4,999,347
171 4,999,348
183 4,999,349
210 4,999,350
228.2 4,999,351
235.8 4,999,352
250 4,999,353
4,999,354
253 4,999,355
254 4,999,356
277 4,999,357
297 4,999,358
301 4,999,359
315 4,999,360
332 4,999,363
333 4,999,361
334 4,999,362
340 4,999,364
341 4,999,365
380 4,999,366
403 4,999,367
4,999,368
410 4,999,369
412 4,999,370
422 4,999,371
4,999,372
437 4,999,373
451 4,999,374
455 4,999,375
468 4,999,376
507 4,999,377
558 4,999,380
567 4,999,378
4,999,379
618 4,999,381
646 4,999,382
689 B1 4,708,966
B1 4,847,303

CLASS 521

103 4,999,383
134 4,999,384
149 4,999,385

CLASS 523

122 4,999,386
205 4,999,387
400 4,999,388
440 4,999,389

CLASS 524

30 4,999,390
94 4,999,391
99 4,999,392
126 4,999,393
514 4,999,394
607 4,999,395
650 4,999,396
755 4,999,397
837 4,999,398

CLASS 525

185 4,999,399
196 4,999,400
279 4,999,401
305 4,999,402
322 4,999,403
329.6 4,999,404
338 4,999,405
386 4,999,406
457 4,999,407
463 4,999,408

CLASS 526

169.2 4,999,409
318.3 4,999,410

CLASS 528

9 4,999,411
28 4,999,412
30 4,999,413
125 4,999,414
171 4,999,415
190 4,999,416
271 4,999,417
272 4,999,418
322 4,999,419
371 4,999,420

CLASS 530

350 4,999,421
351 4,999,422

CLASS 536

4.1 4,999,423
22 4,999,424
30 4,999,425

CLASS 544

127 4,999,426
242 4,999,427
277 4,999,428

CLASS 546

21 4,999,429
105 4,999,430
168 4,999,431
286 4,999,432

CLASS 548

260 4,999,433
263.2 4,999,434

CLASS 549

45 4,999,436
222 4,999,437
329 4,999,438
397 4,999,439
556 4,999,440

CLASS 552

291 4,999,441

CLASS 556

14 4,999,442
136 4,999,443
137 4,999,444
138 4,999,445
470 4,999,446
478 4,999,447

CLASS 558

411 4,999,448

CLASS 560

8 4,999,449
101 4,999,450
124 4,999,451
208 4,999,452
211 4,999,453
213 4,999,454

CLASS 564

59 4,999,455
207 4,999,456
223 4,999,457

CLASS 600

6 4,998,912
14 4,998,913

CLASS 604

20 4,998,931
67 4,998,914
73 4,998,915
95 4,998,916
96 4,998,917
132 4,998,918
164 4,998,919
167 4,998,921
192 4,998,922
198 4,998,920
251 4,998,926
283 4,998,713
4,998,925
4,998,927
365 4,998,928
385.2 4,998,929
798 4,998,924

CLASS 606

15 4,998,930
29 4,998,932
41 4,998,933
44 4,998,934
54 4,998,935
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89 4,998,937
130 4,998,938
194 4,998,923

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D3— 30.1 315,245
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199 315,250
D6— 333 315,252
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356 315,255
358 315,256
366 315,257
379 315,258
380 315,259
405 315,260
426 315,261
438 315,262
462 315,263
466 315,264
495 315,265
315,266
542 315,268
549 315,267
551 315,269
567 315,270
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330 315,272
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673 315,275
693 315,276
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64 315,281
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98 315,284
317 315,285
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333 315,287
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D9— 300 315,291
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337 315,294
341 315,297
370 315,295
381 315,298
389 315,296
403 315,299
315,300
414 315,301
415 315,302
418 315,303
424 315,304
432 315,305
434 315,306
447 315,307
450 315,308
456 315,309
D10— 25 315,310
32 315,311
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40 315,313
50 315,315
64 315,316
73 315,317
89 315,318
128 315,319
461 315,314
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117 315,321
120 315,322
131 315,323
D12— 92 315,324
96 315,325
154 315,326
173 315,327
178 315,328
196 315,329
D13— 107 315,330
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156 315,332
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115 315,339
116 315,337
118 315,338
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315,344
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147 315,347
156 315,348
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223 315,350
234 315,351
251 315,352
253 315,353
299 315,354
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12 315,359
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23 315,362
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52 315,366
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143 315,380
199 315,382
201 315,383
208 315,384
210 315,385
219 315,386
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237 315,388
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216 315,395
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241 315,398
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54 315,411
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315,423
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315,425
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30 315,428
35 315,429
D29— 22 315,427
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D32— 21 315,431
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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 : 4,998,311	4,998,688	4,999,280	4,999,820	4,999,191	4,998,422
4,999,001	4,998,689	4,999,285	4,999,832	4,999,488	4,998,501
4,999,230	4,998,698	4,999,287	09 : 4,998,335	4,999,607	4,998,544
4,999,728	4,998,701	4,999,291	4,998,372	15 : 4,998,529	4,998,592
4,999,744	4,998,704	4,999,306	4,998,555	16 : 4,998,727	4,998,760
04 : 4,998,329	4,998,712	4,999,307	4,998,613	4,998,956	4,998,761
4,998,343	4,998,732	4,999,309	4,998,617	4,999,102	4,998,828
4,998,433	4,998,740	4,999,311	4,998,637	4,999,160	4,998,909
4,998,598	4,998,753	4,999,339	4,998,703	4,999,646	4,998,920
4,998,664	4,998,768	4,999,383	4,998,759	4,999,652	4,999,149
4,998,734	4,998,770	4,999,421	4,998,819	4,999,724	4,999,241
4,998,743	4,998,803	4,999,432	4,998,964	17 : 4,998,304	4,999,255
4,999,057	4,998,822	4,999,445	4,999,040	4,998,354	4,999,304
4,999,585	4,998,824	4,999,448	4,999,069	4,998,363	4,999,388
4,999,782	4,998,826	4,999,463	4,999,256	4,998,365	4,999,408
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4,998,628	4,998,866	4,999,523	4,999,527	4,998,464	4,999,550
4,998,735	4,998,880	4,999,525	4,999,641	4,998,496	4,999,582
4,999,347	4,998,886	4,999,528	10 : 4,998,421	4,998,516	4,999,632
06 : 4,998,301	4,998,892	4,999,553	4,998,487	4,998,546	19 : 4,998,536
4,998,302	4,998,894	4,999,562	4,998,578	4,998,605	4,998,554
4,998,303	4,998,902	4,999,565	4,999,055	4,998,619	4,998,623
4,998,308	4,998,916	4,999,573	4,999,123	4,998,656	4,998,645
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4,998,355	4,998,923	4,999,594	4,999,419	4,998,715	4,999,200
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4,998,409	4,998,937	4,999,703	12 : 4,998,361	4,998,849	4,999,035
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4,998,434	4,999,014	4,999,771	4,998,648	4,998,969	4,998,652
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08	:	315,285	17	:	315,303	25	:	315,432			315,306
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42	:	315,243	55	:	315,282						
		315,298			315,308						

PLANT PATENTS

06	:	7,468			7,469			7,470	42	:	7,467

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